Veterinary Medicine

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Milk

On the following page we reproduce (reduced) an advertisement of the Metropolitan Life Insurance Company that appeared recently in Collier's and other magazines of national circulation. Such advertising, although paid for by the insurance company responsible for it, is beneficial in just the measure that it is effective to many industries and to the public in general. Viewed from its commercial aspect alone, aside from its humanitarian phase, which doubtless to a degree influenced the Metropolitan Life in promoting it, it is good business for the company in that an increased use of milk will enable its hundreds of thousands of policy holders to live longer and pay more dividends on their life insurance before the company is put to the expense of paying the policies.

An increased use of milk and its products would, of course, improve the dairy industry of the country and the swine industry because of the greater amount of skim milk and buttermilk available for feed. All agriculture would benefit since milk production is so largely a side-line of general farming and because of the greater amount of cheap fertilizer that would be available for improving the fertility of the farms. That an advantage to the whole nation would accrue from the increased prosperity of 40 per cent of the population, is obvious.

That veterinary practice would be increased and improved by increased dairying and greater agricultural prosperity is, of course, realized by all veterinarians. That practice among a clientele that has a regular and steady cash income is the most desirable sort of veterinary practice, is recognized most vividly by those who have practiced in a locality devoted to a single crop as wheat or cotton. In short, everything that promotes the increased consumption of dairy products helps everyone but the undertaker, and the veterinarians are among those who share most largely in the benefits.

The booklet referred to in the advertisement is a most valuable one. We hope that no veterinarian will be so blind to his own interests as to fail to obtain a copy and to circulate as opportunity offers the truths it contains. It was written by Dr. Milton J. Rosenau of Harvard University, one of the greatest health authorities of the nation. The following paragraphs constitute such a compelling argument for the use of milk that we reproduce them with permission.

Milk is our best all-round food. It is the most perfect food we have. It is also one of the cheapest foods, even at the present prices. Milk is the most difficult of all our foodstuffs to collect, handle and transport. It requires the greatest care from pasture to pail, and from pail to palate. Milk spoils quicker than any other food. It spoils even quicker than fresh fruit and berries. It must be kept clean, cold and covered.

Milk tastes good; it is easily digested, and is very nourishing. It makes bone, brawn and blood. In fact, the vigor and success of a nation depend largely upon the amount of milk it uses. In the United States, we use something like forty billion quarts of milk a year. This would make a lake large enough to float all the navies of the world. Yet this is only about half a pint of milk a day for each person. Only one-quarter of this is actually used as milk, the other three-quarters being made into butter, cheese, and other milk products.

Milk is the greatest factor of safety in our diet. It makes the ration complete, promotes growth and keeps the body strong.

Milk is the best food we have. There is no substitute. Save on other things if you must, but not on milk. You cannot afford to do without it—growing children especially need plenty. Buy at least a pint of milk a day for each person in the household. No other food can take its place.

Milk looks like a simple fluid, but really it is very complex. A glass of milk contains a mixture of all the important things that make up a mixed diet. One can get the same nourishment from milk as from a meal made up of meat and eggs, sugar and cereals, oils and fats, with salt and water.

Milk is good fuel, because it contains fat and sugar. The body needs fuel to keep it warm

and to make it move and work and play, just as the steam engine needs coal or the automobile needs gasoline.

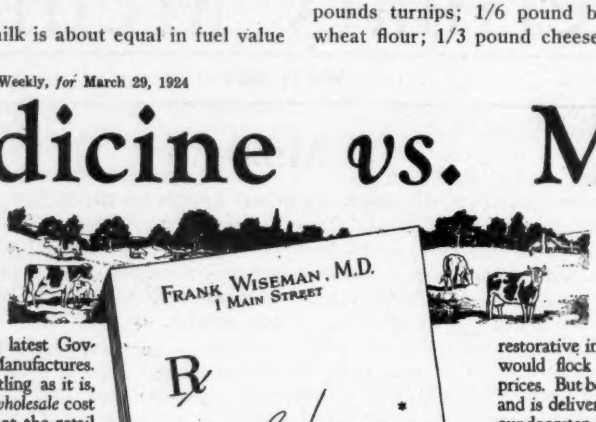
One quart of milk is about equal in fuel value to any of the following: 2 pounds salt codfish; 3 pounds fresh codfish; 4 pounds beets; 5 pounds turnips; 1/6 pound butter; 1/3 pound wheat flour; 1/3 pound cheese; 3/4 pound lean

Collier's, The National Weekly, *for* March 29, 1924

Medicine *vs.* Milk

MORE than $219,000,000 a year for patent medicines in the United States! This is the astounding figure quoted by the latest Government Census of Manufactures. And this figure, startling as it is, represents only the *wholesale* cost of these medicines—not the retail price paid by the public in its frantic search for health.

If we maintain the right mental attitude, if we eat, sleep and exercise properly, the chances are we will seldom feel the need of medicines. There are times, now and then, when we all feel a little below par. If, instead of rushing off for a bottle of Dr. Bunkum's Tonique to brace us up, we would go to Nature herself for the greatest of all food-tonics—milk—we would be a different lot of men and women.



Here is a prescription that is worth $219,000,000 many times over. It has built more strong bodies than all the medicines invented or compounded by man from the beginning of time.

Milk is Nature's Patent

—the only food she ever made solely for food. It cannot be reproduced artificially. Only Nature herself can so perfectly blend all the elements of a well-balanced diet as she has in milk.

Milk sounds like patent medicine when all its virtues are catalogued. It is the oldest prescription in the world—Nature's prescription for the building of strong, healthy bodies, Nature's revitalizer, Nature's maker of rich, red blood, Nature's nerve quieter, Nature's antidote for that "tired feeling"

If milk were put up in bottles of a different shape and size, if it were given a fanciful name and announced for what it really is as "the greatest body builder and health restorative in the world", people would flock to buy it at fancy prices. But because it costs so little and is delivered every morning at our doorstep, we seldom give its virtues a thought. We are apt to disregard the value of familiar things.

Drink More Milk and Save Money

Milk is an ideal food for all ages—not just a pleasant drink or food merely for children. It looks simple, but it is the most complex food in the world—liquid meat, sugar and fat with mineral salts and life-giving vitamines added.

Nutrition experts declare milk to be the most nearly perfect food we have as well as one of the cheapest, for it can take the place of so many more expensive foods. A quart of milk contains the same "energy" value as 8 eggs, or 2 pounds of potatoes, or ¼ of a pound of lean beef or ½ of a pound of cheese.

Save on other things if you must, but not on milk. If anybody in your family objects to drinking raw milk there are many ways in which it can be served—in soups, custards, ice cream, desserts, cocoa, cream sauces—lots of good things. Use it—if you are run down, to build you up. Use it—if you are well, to keep you healthy and strong.

The Metropolitan Life Insurance Company—in bringing to the minds of millions of our citizens an appreciation of the wonders of milk—hopes to increase the use of this most nearly perfect food. And, in addition, it desires to arouse public consciousness to the dangers of milk that is not produced and marketed under proper conditions—and by so doing bring about more rigid inspection and safeguard the cleanliness of the milk supply of the nation.

The Treasury Department of the U. S. in its Public Health Bulletin No. 136 publishes the results of a study of the practices of the Health Departments in 83 cities of the United States—milk supervision being one of the subjects under investigation. It is surprising and disappointing to find that only 31 of the 83 cities report the use of a milk grading system and among these 31 there is little uniformity as to requirements. Only 39 cities demand the tuberculin testing of all herds from which raw milk is sold. Medical examination of milk handlers is carried out by but 19 of the 83 cities.

Find out what the conditions are in your city. Investigate the source of your milk supply. Organize a committee to go to your local Board of Health or Health Officer and find out what is being done to make milk safe. If they report the milk is not properly inspected, agitate the question in your local newspapers. Make sure that you get *safe* milk. If your own local authorities have not yet taken up the matter of protecting your milk supply, it is advisable that you Pasteurize your own milk at home. You will find full and simple directions in a booklet "All About Milk" which the Metropolitan Life Insurance Company will be glad to send you by mail, free of charge.

HALEY FISKE, *President.*

Published by

METROPOLITAN LIFE INSURANCE COMPANY—NEW YORK

Biggest in the World, More Assets, More Policyholders, More Insurance in force, More new Insurance each year

round beef; 2 pounds potatoes; 6 pounds spinach; 7 pounds lettuce; 4 pounds cabbage; 8 eggs.

One ordinary glass of milk is about equal in fuel value to: 2 large eggs; 1 large serving of lean meat; 2 moderate-sized potatoes; 5 tablespoonfuls of cooked cereal; 3 tablespoonfuls of boiled rice; or 2 slices of bread.

Food is more than fuel—it repairs waste, helps growth, builds flesh and bone. Milk does all this. That is, milk is a good food, not only because it is a good fuel, but also because it has life-giving properties. Milk is both fuel and food.

Milk is rich in vitamins. It contains all the different kinds of vitamins which are essential to life.

Milk contains a great deal of lime. Children need lime and plenty of it, especially for their growing bones and teeth. The lime in milk is easily changed in the body into bone. Big boys and girls, and even grown people, need lime, because the bones are always wearing away, little by little, and this wear and tear must be replaced. Lime helps build bones and makes them strong.

In nature's plan, the milk is taken directly at its source while pure, sweet, clean and wholesome. Milk was never intended to see the light of day. Nature's plan keeps out dirt, germs, flies and fevers.

Milk is valuable for grown-ups, especially for sick people. It was found in the army hospitals that the wounded recover more quickly when they have milk. Milk helps to keep you strong, vigorous and young.

Grown-up people can live for months and months on milk alone, but a hard working man would have to drink many quarts each day to keep up his vitality and repair the wear and tear of his body. However, if milk is used in combination with other food, one is sure of getting a well-balanced ration. One pint of milk will serve this purpose for grown-ups—children need a quart.

Children must have milk—adults ought to.

The souring and curdling of milk is wrongly called nature's danger signal. Nature has no danger signal for milk. The dangers in milk cannot be seen with the naked eye. Our sense of taste and smell are poor sanitary guides. Curdled milk may not be harmful, and is often beneficial.

When milk curdles, very much the same thing takes place as when an egg is heated—the albuminous matter is made hard, lumpy, and insoluble. The curd is the thickened albumin of the milk.

Rennet also causes milk to curdle. This is the ferment found in the gastric juice; hence, the first thing that happens to milk when it reaches the stomach is to become curdled. The curd is then acted upon by the pepsin and digested. If the lumps are large and tough, the digestion is slower than if the lumps are soft and small. Therefore, drink milk slowly.

Milk is cheap, even at present prices. It is too bad that the housewife is inclined to cut down on milk when the price goes up. It is poor economy to save on vital foods. It is not how much we pay, but how much we get in return that counts. Thus, fourteen cents' worth of milk does the body more good than fourteen cents spent on steak at forty-eight cents a pound, or fourteen cents' worth of eggs at sixty cents a dozen. At these prices, milk would be worth over forty cents a quart.

Milk contains "life" because it contains vitamins. Vitamins are vital substances of great important in the diet. They promote growth and favor utilization of food. It is not possible to live without vitamins even though full quantities of food are eaten. Vitamins are not stored in the body and it is therefore necessary for us to eat food containing some of them most every day. In this sense we live a "hand to mouth" existence.

There are several kinds of vitamins. One of them is found in milk fat. Another is found in the watery part of milk. Milk is very rich in these two vitamins, which are not injured by heat. Milk also contains a third vitamin known as the antiscorbutic vitamin, which is interesting because it prevents scurvy, a common ailment among children.

Milk has everything needed in the diet. It is a complete mixed diet in itself. It has sugar and fat which give energy to move the body—like coal to an engine; it has mineral salts which build up the bones and keep the body in good shape; and albumin (protein) which—like meat or white of egg—is important in making brawn and sinew. Of all the different kinds of protein to be found in food, the best is found in milk. Sugar, mineral salts, fat, and protein are all necessary in a well-balanced diet. But these substances without vitamins will not nourish the body or promote growth.

Think of the value of having one food which supplies all the necessary elements of a good mixed diet—and which at the same time can be used without special preparation.

Pure milk is better than purified milk, but it is so difficult to get pure milk that our only real safety lies in pasteurization.

Milk is readily tainted and absorbs odors and flavors just as charcoal does. It will soon taste of tobacco, onions, fish, or fruit if exposed to these things in an open pitcher or bottle. Turnips, onions, and other strong-tasting substances fed to the cow will also give a flavor to the milk. Milk should have no odor at all, or, at most, only a slight characteristic odor. A "cowy" odor, means smelly barns, poor dairy methods and tainted milk.

Foot-and-Mouth Disease Area is Slightly Extended in California

The foot-and-mouth disease outlook in California, as our forms close for this issue (April 17th), is not so hopeful as it was a month ago; or rather the exceedingly hopeful outlook of mid-March has not been justified by conditions that have developed since then.

During the thirty days just passed the disease has spread to six counties in addition to the three counties at first infected. The disease is now known to exist in five counties: San Joaquin, Contra Costa, Merced, Mariposa, and Los Angeles counties. The infection is believed to have been eradicated from four counties.

In Merced, Mariposa and Los Angeles counties, the infection has been persistent and serious, but reports for the last week indicate that the sanitary authorities are slowly gaining control, and their predictions are that there will be no further spread to uninfected counties. In these counties the infection is among range cattle and for that reason unusually difficult to handle. The task of examining wild range cattle is laborious and slow in the extreme.

Up until the present in the California outbreak about 340 herds have been affected, comprising about 25,000 cattle, 14,000 sheep, 10,000 hogs, and 300 goats. The forces of control are getting better and better organized and gaining in experience and efficiency all the time. The prospect of confining the outbreak to California seems certain and of early eradication seems good. The cost of eradication will inevitably be high, probably exceeding by two or three hundred per cent the $1,000,000 at first asked of Congress by the Chief of the Bureau of Animal Industry. The loss due to the necessary interference with commerce and trade is enormous.

The Federal inspectors now engaged in the control work number more than a hundred. About half this number of California inspectors are likewise engaged. Dr. U. G. Houck, confined to his bed by a nervous breakdown at the beginning of the outbreak, has recovered and proceeded to California to act as the personal representative of Doctor Mohler, who cannot be spared from his duties in Washington at this time. The Federal forces are working under the direction of Dr. Rudolph Snyder and the state forces under G. H. Hecke, director of the State Board of Agriculture. All available California veterinarians have been drafted for control work.

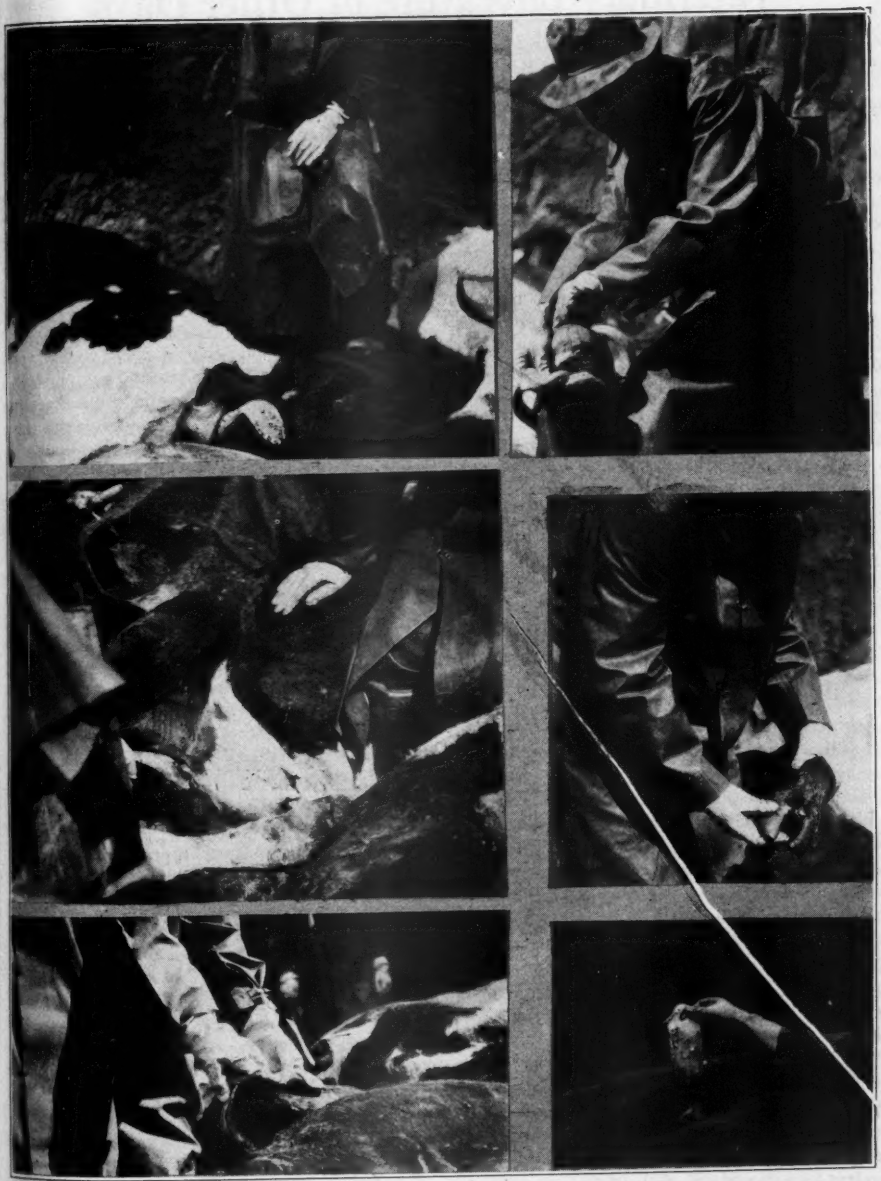
An intensive campaign of poisoning has been inaugurated against wild animals in the infected district and against dogs and cats wandering at large. Hunters were also employed early in the outbreak to rid the district of prowling animals, including coyotes, bobcats and stray dogs.

A gratifying feature of the control measure, department officials say, is the splendid spirit with which livestock owners are accepting the destruction of their herds, and their willingness to wait for indemnity payments for which appropriation has not yet been made. There has been general compliance also with quarantine measures. A few persons who have violated the restrictions have been dealt with promptly by the courts. One offender received a six-months' jail sentence, and others paid fines.

Inspectors have been working practically from sunrise to sunset. Much of the success in combatting the disease has been due to the wholesale method of slaughter and burial. Rifles have proved to be the quickest means of slaughtering the thousands of diseased and exposed animals. On one farm where 350 dead cattle had to be buried, the task of making the huge ditch six feet deep in heavy clay soil was encountered. The inspector in charge, however, found a contractor who put eighteen four-horse teams on the job, completing it quickly.

To prevent the foot-and-mouth disease from penetrating into Hawaii, Dr. P. H. Browning, recently appointed territorial veterinarian, has instituted a foot-bath of creosote solution for passengers before disembarking. The soles of the shoes are immersed in the creosote contained in a galvanized box four feet long, and two in width, at the head of the gangplank of every ship landing at the islands.

Lesions of Foot-and-Mouth Disease



Reading from left to right, top to bottom—Ulceration on tip of tongue; ulceration of the dental pad; ruptured vesicles on teats and udder; lesion in interdigital space; peeling of epithelial layer from lateral surface of tongue; tongue excised showing entire surface with vesicles on denuded epithelium. Photos by Dr. Geo. H. Hart, University of California.

Veterinary Literature of Other Days

Ten Years Ago

The following news items and discussions appeared in VETERINARY MEDICINE for May, 1914:

Report of a case of tetanus in which a new treatment, lobelin sulphate, was used with success.

An article on veterinary hygiene and the public health by Chas. H. Higgins, Ottawa, Canada.

An exhaustive article on contagion by immunization by Prof. James Law of Ithaca, N. Y.

An article on constitutional diseases of birds by B. F. Kaupp, Spartanburg, S. C.

An article on the history of the Army Veterinary Corps in the British Army by Major General Robert Pringle, Director of the British Army Veterinary Service.

Diseases of the prostate, urethra and prepuce in dogs, by C. G. Saunders.

The scope of abdominal surgery in animals, by J. H. Blattenberg, Lima, Ohio.

Methods of administering remedies, by C. F. Lynch.

Change of name of the popular Indianapolis firm from Pitman-Myers Co. to Pitman-Moore Co.

Notice of the meeting of the Tenth International Veterinary Congress at London, August, 1914.

From an editorial in this issue, we reproduce the following that subsequent events proved prophetic:

"Great Britain accorded veterinarians in the British Army their present enviable position of authority and opportunity for service only after a most disastrous experience with veterinarians under the direction of officers of the line in actual warfare. The article by Doctor Steele in our March issue graphically tells of the loss of $76,000,000 worth of horses and mules in three years, during the Boer War. Official records of the British War Department show this loss to have been largely preventable.

"As this is written the U. S. Marines have occupied Vera Cruz. Invasion of Mexico by the American Army seems imminent. The Mexican Army and particularly the Army of the Constitutionalists, is made up largely of cavalry, and should the American Army invade Mexico, as it may have done before this reaches the readers, it is probable that a large number of cavalry horses will be used. Certain it is that there must be many transport animals, and under present conditions the United States stands in a fair way to repeat the experience of the British Army in South Africa. The struggle, if it comes, will be a very unequal one of course, but the same is true of the Boer War, yet it did not prevent the British Army from losing tens of thousands of animals from glanders and other preventable diseases."

The following from rather a long quotation from The Veterinary Journal, London, is of interest:

"It is astonishing that a great and civilized country like the United States has for so long persistently refused to grant what even the turbulent Balkan States consider a necessity, and that in their military organization there is no recognition of the veterinary profession as a profession. At the present time the veterinarian in the American Army is a kind of nondescript, neither an officer nor a man."

Twenty Years Ago

The following is from the American Veterinary Review for May, 1904:

In the veterinary literature of two decades ago, the present day reader finds many names of those now prominent in the councils of the profession. In the copy of the American Veterinary Review under examination, we note:

That C. J. Marshall was secretary of the Pennsylvania State Veterinary Medical Association; Dr. E. B. Ackerman, Veterinarian to the Department of Health of Brooklyn, was on the program of the Pennsylvania association, as was also John W. Adams. Prof. H. R. Smith, now live stock commissioner at Chicago, was on the program of the Iowa-Nebraska Association, and A. T. Peters was secretary. A. S. Alexander was elected to membership in the Wisconsin Society of Veterinary Graduates, and David Roberts, of unsavory reputation, took part in the meeting. W. H. Welch was secretary of the Illinois Veterinary Medical Association; P. H. Browning held the same office in the California State Veterinary Medical Association; and D. J. Mangan was secretary of the Veterinary Medical Association of New York County. G. W. Blanche, E. M. Nighbert, N. S. Mayo, L. Van Es, W. L. Williams and W. E. A. Wyman, figure in the news items.

We are frequently reminded of the inevita-

bility of the visit of the grim reaper by mention of many names of recent memory who only twenty years ago occupied the center of the stage.

Thus, Leonard Pearson was president of the Pennsylvania association, and Otto G. Noack succeeded him in the annual election. Roscoe Bell was president of the A. V. M. A., and S. Stewart, whom he had just succeeded, was on the program of the Iowa-Nebraska association. T. Earle Budd was reappointed a member of the New Jersey State Board of Veterinary Examiners. Olof Schwarzkopf was active in army veterinary legislative work. Joseph Hughes and Andrew Smith conferred the degrees at the commencement exercises of the Chicago and Ontario veterinary colleges respectively. S. J. J. Harger and W. Horace Hoskins were active in the Pennsylvania association. H. L. Ramaccotti supplied the clinic for the Iowa-Nebraska association. A. Liautard was editor of the Review and D. Arthur Hughes and W. J. Coates were among the collaborators. Prof. R. J. Withers died during the month.

Editorially, this issue of the American Veterinary Review discussed the sudden popularity of radium; the appointment of Prof. H. Vallee to the chair at Alfort occupied by the late lamented Nocard; the curability of glanders.

Among the original articles, there occurs a discussion of the stomach tube, then a new appliance, by J. M. Philips of St. Louis, Mo.; of parturient paresis by W. H. Ridge; of the laboratory and the veterinary practitioner by Chas. Higgins, then pathologist, Health of Animals Service, Dominion of Canada, and now sales manager for the Lederle Laboratories; and of etiology and treatment of azoturia by B. M. Flint of Vermont.

The case reports include horse, cattle and swine cases. The German review is by Dr. Eichhorn, then with the B. A. I. at Kansas City, now Director, Lederle Laboratories, Pearl River, N. Y. C. H. Jewel, then veterinarian with the 13th cavalry at Manila, now Lieutenant Colonel, retired, at Junction City, Kansas, contributes to the army department.

Under college commencements, we note that the Ontario Veterinary College graduated 68; the Chicago Veterinary College, 58; the Kansas City Veterinary College, 42; the McKillip Veterinary College, 28; and the Indiana Veterinary College, 24.

Case reports and articles from non-graduates are published, and there appears to be little differentiation in the magazine between graduate and non-graduate veterinarians. The same custom prevailed at meetings as is evidenced by the following from a paper read by H. E. Talbot of Des Moines at the Iowa-Nebraska association meeting:

"I will now make a short report of the condition of veterinary affairs in Iowa as they are at the present date. We have 221 graduates registered and 544 non-graduates. There is very little of the opposition to the law which was so apparent two or three years ago and violations are becoming more rare as the law is more generally recognized and its beneficial effects appreciated. I have nothing but praise for the veterinarians of Iowa for their loyalty to the board and their efficient aid in the law's enforcement; and, with their cooperation we expect in the near future to have our law as greatly respected and as generally obeyed as any upon the statute books of the state. I have noticed, almost with feelings of regret, the passing of the old-time 'hoss doctor' from our midst. By this I do not refer to the average non-graduate of our state, for I have generally found him progressive and fully capable of keeping abreast of the times. What I do refer to is the *old-time practitioner,* the man who still does things just as his grandfather did before him, who has cast himself in front of the car of progress and who deprecates the fact that the world moves on. He is still to be found, a remnant of a once numerous type, powerful in his day and once a leading figure in his community. He has fought the introduction of advanced methods; he has taken his stand, and the progressive veterinarian has passed on and left him all alone. But who will begrudge him the remnants of the fame which was once his own? Who would shatter the old ideals upon which his faith is founded? He stands today the connecting link between the past and the present in veterinary science. He is the sole survivor of a once numerous race."

Thirty Years Ago

The following were published in The Journal of Comparative Medicine and Veterinary Archives for May 1894:

The editors at that time were W. A. Conklin, R. S. Huidekoper, A. W. Clement and W. Horace Hoskins. The latter was business manager.

Perhaps the most interesting material in this issue to present day readers is a list of the 1894 graduates at a number of the veterinary colleges. From this list we note that the Ontario Veterinary College graduated 140 that year, including Judson Black of Michigan, A. J. Cline of Ohio, S. F. Musselman, now deceased, of Kentucky, E. M. Nighbert of Illinois, from

whose pen we published an article last month, S. H. Ward, now deceased, of Minnesota, and many others well known in the profession. Both Black and Nighbert were gold medal students.

The Ohio State University Veterinary Department graduated 34 in 1894, including John A. Kiernan of New Jersey, who received the gold medal for the best general examination.

At the eleventh annual commencement of the Chicago Veterinary College, March 22, 1894, 65 were graduated, including J. S. Anderson of Nebraska; J. H. Gain, Nebraska; J. H. Kannal, Indiana; D. H. Miller, C. E. and H. J. Stewart, all of Iowa; and C. A. White and W. A. Meyers of Illinois.

The American Veterinary College graduated 42 in 1894.

Thus, there were nearly 300 graduates that year from these four schools. Horse practice at that time constituted perhaps 90 per cent of all veterinary practice, and the price of horses reached record low levels in that year and the following. Yet, the number of graduates for 1894 exceed by nearly 50 per cent the graduates for 1924, when veterinary practice includes all food producing and pet animals and a dozen lines of federal, state, municipal, association and corporation work ,not dreamed of thirty years ago.

More than twenty pages in this issue are occupied by reports of veterinary meetings, including the German Veterinary Medical Association of New York; the California State Veterinary Medical Association, of which R. A. Archibald was secretary; the Massachusetts Veterinary Association for January and also for February, J. W. Parker, secretary; the Erie County Veterinary Medical Society, of which John Wende was president, and the Pennsylvania State Veterinary Medical Association, of which W. Horace Hoskins was president.

The veterinary practice act of Pennsylvania is published in this issue as is also the constitution and by-laws of the Veterinary Medical Association of New York County.

Parturient paresis, purpura hemorrhagica and carbuncle of the coronary ligament, are discussed in short articles.

The leading article in the magazine is one on the anatomy of the large American fluke by Albert Hassall.

Forty Years Ago

The following discussions appeared in The Quarterly Journal of Veterinary Science In India and Army Animal Management for May, 1884.

The editors were: Charles Steel, Superintendent, Army Veterinary School, Poona; Fred Smith, V. S., 12th Royal Lancers; and John Henry Steel, V. S., 1st Madras Light Cavalry. Both Smith and J. H. Steel subsequently wrote textbooks that attained wide popularity among American veterinarians.

The leading editorial in this issue is on "The Inter-relation of Human and Veterinary Medicine," in which the author makes a strong plea for closer co-operation between what he regards as two branches of a single science and a greater use of the discoveries from research in each branch by the other.

It is stated in this article that some claim that a Spanish veterinarian anticipated Harvey in the discovery of the circulation of the blood. It mentions that the world renowned surgeon, Sampson Gamgee, and the eminent ophthalmologist, Nettleton, are veterinarians as well as physicians.

The author points out that the operation of tenotomy, neurotomy and tracheotomy originated with veterinarians; that anthrax vaccination originated with Toussaint, a French veterinarian, and that intra-tracheal injection and the use of alkaloids were initiated by veterinarians; also that Coleman, a veterinarian, first proved that the blood is a carrier of the specific contagium of zymotic diseases by conveying glanders through blood transfusion.

The author mentions the belief that foot-and-mouth disease is communicable to man; that certain stages of all or nearly all tapeworms of man are spent in animals; that tuberculosis and actinomycosis are diseases of both man and animals.

There is a discussion of methods of shoeing by the Arabs; of diseases of elephants; diseases of camels; diseases of bullocks; of rinderpest; and on the prevalence of animal diseases in general.

An article on "Observations and Investigations of Anthrax" dealing at length with sanitary police measures necessary for its control, is almost as applicable today as forty years ago.

An article on "The Grasses of the Madras Presidency" under the head of dietetics is illustrated by 23 full page plates.

Sixty Years Ago

The following articles and discussions are published in the May issue of the Edinburgh Veterinary Review and Annals of Comparative Pathology, for 1864:

Anatomical Arrangement of the Foot of the Horse, by Prof. Gamgee.

Cardiac Polypi in a Mare, by John George Dickinson.

The same author describes a fracture of the metatarsal bone in a horse that was treated with starch bandages with complete recovery in eight weeks. Another case of fracture of the tibia is described in a filly, in which a complete recovery followed the same treatment.

Obstruction of the Bowels of Dogs, by Thomas Greaves. The author describes three cases, all unusual now as they were then. One, a large mastiff, lived seven weeks after the passage of feces stopped. On autopsy an obstruction 19 inches long, 2½ inches in diameter and weighing two pounds, six ounces, was found.

Tetanus, tumor of the brain and melanosis of the medulla are interestingly and instructively discussed.

There is much discussion of desirable legislation and numerous reports of meetings of veterinary societies, also an extensive review of current veterinary literature.

In a discussion of foreign bodies in the stomachs of ruminants reprinted from the Scottish Farmer of March 23, 1864, all that is now known concerning this subject and traumatic pericarditis of cows is given, together with the technic of the operation for the relief of this condition.

Pleuro-pneumonia in Britain and the colonies, the conveyance of diseased cattle, the castration of lambs, and diseased meat, all receive interesting consideration.

In a very long and very technical article on the physiology of the pneumo-gastric nerve, James Law discusses exhaustively the cause and pathology of roaring.

A report of the Yorkshire Veterinary Medical Society and of the North of England Veterinary Medical Association, both quarterly meetings, indicates a flourishing condition of the veterinary associations of three score years ago.

Ascariasis*

Dr. James McDonald, Springfield, Illinois, Inspector in Charge, Hog Cholera Control for Illinois, Bureau of Animal Industry

No branch of live stock farming gives better results than the raising of well bred swine, when conducted under proper sanitary conditions.

The number of pigs lost annually between farrowing time and weaning time is enormous. Over 40 per cent of the pigs farrowed in the spring of 1923 died before weaning time, according to a survey made by the rural mail carriers for the United States Department of Agriculture. One cause for this great loss was the common intestinal round worm (Ascaris lumbricoides) one of the most injurious of the various kinds of worms that infest the pig.

Investigations in recent years by Stewart, Ransom and Foster, and Yoshida have found that the ascaris eggs are deposited in the small intestine by the adult worm and pass out of the body in the excreta, contaminating pastures and feed lots. In this stage of development they are not infectious, but in a few weeks if temperature and moisture conditions are favorable, the eggs become infectious. If the eggs in the infectious stage are swallowed by pigs, they hatch after reaching the small intestine, and then migrate by way of the blood stream to the liver, heart and lungs, into the lung tissue, passing up the trachea to the pharynx, then down the esophagus to the stomach and into the small intestine. During this time the parasite is microscopic in size and requires about ten days to make the journey, reaching maturity in about two and one-half months.

In passing through the lungs the young worms cause small hemorrhages and may cause pneumonia. Pigs that survive the infection often fail to grow and develop properly but remain small and stunted.

From the intestine the parasites frequently migrate into the gall bladder and ducts of the liver, causing destructive lesions.

Ascarid eggs are very resistant to cold weather and droughts, and chemical disinfectants have little or no effect. They have been successfully developed to a stage containing veriform embryos in solutions of sulphuric, hydrochloric, nitric and acetic acids 50 per cent or less in strength. (Galli-Valero, 1914.)

I know of no successful treatment for Ascaris pneumonia. For the intestinal infestation, santonin and calomel and oil of chenopodium and castor oil are recommended, the latter proving the most satisfactory.

With this knowledge at hand any effort to

*Excerpt from a paper presented at the Fifth Annual Conference for Veterinarians, University of Illinois.

control this parasite must primarily be through sanitation. The soil of hog lots, old hog pastures and sleeping quarters are likely to be heavily laden with the eggs of worms and may be picked up with the food. It has been estimated that one full grown female worm in the intestine of a hog may produce as many as 80,000,000 eggs. These eggs may adhere to the udders of sows and be swallowed by the new born pigs when nursing. If the new born pigs become infected they may develop thumps and pneumonia as the worm takes the journey described in the life cycle. Should the pig pass through this state successfully and the worms reach the intestine in large numbers irreparable damage will have been done before the owner realizes that the pigs need attention.

I recently autopsied a pig on a farm where the fall pigs were dying and found the duodenum and bile duct entirely filled with adult ascarids. The owner advised me the pig was nine weeks old, evidently its first mouthful must have been ascarid eggs.

The McLean County system of hog sanitation, of which the cardinal steps are clean farrowing pens, clean sow, clean pasture, clean hog lots, has given excellent results where properly applied in reducing the losses from ascarid infestation and other filth-borne diseases to which swine are subject.

Contracts and Liabilities of the Veterinarian

By D. M. Campbell, Chicago

Just as we have two classes of laws, statute law and common law, or legislative enactment and well established custom, we have two general classes of contracts—those that are *formal*, either written or verbal, and those that are *implied*. The implied contracts or the customs of trade, far outnumber the formal or written and verbal contracts. Implied contracts must always give way to the formal, the written or oral, contract. For example, if the usual and reasonable charge for making a certain call of a certain distance in a given locality is $5.00, this established custom in the matter virtually constitutes a contract and a veterinarian would not be able to collect in court a fee in excess of that amount, nor would a client be able to avoid paying a fee of approximately that amount on the ground that it was excessive; but if, before making the call, the veterinarian and the client agree either verbally or in writing upon a charge of $25.00, the formal contract would hold, and the client could not avoid payment of the higher sum on the ground that it was not customary, unreasonable or excessive.

It is common for veterinarians to say they never guarantee anything in their practice, and perhaps many of them believe it, but such are living in a fool's paradise. I use this expression figuratively and do not mean to imply that any veterinary practice is a paradise. A veterinarian must inevitably guarantee much in undertaking the practice of veterinary medicine. When one holds himself out as a veterinarian, and by that I mean when one establishes himself in practice and assumes work of this kind, he guarantees or warrants, as is said in law, at least five separate and distinct things, and it is important that every veterinarian be familiar with these five guarantees, because for them he is held to account in the courts and by the laws of the land. The violation of any of them lays him liable to forfeitures of his fees and in some cases for the payment of damages.

Let us get clearly and definitely in mind what these five things are that each of you guarantee every time you take down the telephone receiver in response to a client's call and tell him that you will come.

First: You guarantee that you are legally qualified to practice your profession. That is, that you have complied with the laws of the state regulating veterinary practice. That you have a license issued by the proper authorities; that you have recorded this license with the proper authorities if such is the provision of your law, and fulfilled any other legal requirements of the law licensing veterinary practice. If you have failed to fulfill any of these legal requirements, you cannot force the collection of a fee for your services and your liability for certain damages is considerably greater than if you were a legal practitioner.

Second: You guarantee your client that your educational training and experience enable you to

treat the case in accord with the known facts of science. It will be realized this is a large undertaking when we think of the frequent scientific discoveries and the rapid advancement of the profession and the revolutionary changes that have come about in the treatment of cases; but the law takes the stand that as practitioners you are entitled to certain rights and privileges and that if you voluntarily enter the field you must accept its obligations also, and one of them is to keep up to date in scientific matters.

Third: You guarantee your client that you will continue the case and render such service as may be needed until the case shall be terminated either by the death of the animal, recovery, or the proper severing of the relations existing between you and the owner of the patient. Having assumed the responsibility of the case, you may not shirk it or neglect it. You are supposed to be the best judge of how many calls are necessary and what treatment, care and attention are required, and you cannot shift this responsibility to the owner, except by a formal contract; i. e., by his agreeing to it. You do not have to begin a case. You cannot be forced to make a call or to accept a patient at your hospital, but having started with a case, you must not accept so many others that you have insufficient time to make the requisite number of calls and give it the requisite attention. Having made one call, you must stay with that case until it is terminated in one of the three ways; by recovery, and of this you are to be the judge; by death; or by a formal withdrawal from the case with the consent of the owner, or after due notice to him that you will withdraw. The owner may discharge you at any time by giving you due notice, but in no other way.

Fourth: You guarantee the owner that you will use the approved methods of practice. For example, if yours is a city practice and you are called to treat a case of a puncture wound, you must administer tetanus antitoxin or obtain the owner's consent to withhold it. Should you fail to administer it and not say anything to the owner about it and the animal later succumbs to tetanus, you are liable for its value. More than one veterinarian has had to pay for a horse under such circumstances. Or, if yours is a country practice and you are called to a herd of sick hogs and find that they have cholera, you must use serum on those probably susceptible and not yet affected, or obtain the owner's consent to withhold it; otherwise, he could probably hold you for the value of the animals should they contract cholera and die.

Fifth: In undertaking the treatment of a case, you undertake to use due care and diligence. What constitutes due care and diligence is often a matter for the court to determine and will be considered to be the care and diligence customarily rendered by *good* practitioners in that locality. The circumstances attending the case will often have a bearing on the decision in this matter. If untoward results follow a call made by a veterinarian in a state of intoxication, it would be more difficult for him to establish that he had used care and diligence than it would be if he had been sober. Gross carelessness or indifference is not to be countenanced. Not only does a client not have to pay for such services, but he can collect damages resulting from the failure on the part of the veterinarian due to carelessness or indifference. What might pass for due care and diligence for an animal of little value might not suffice for an animal of great value. The guaranty to use due care and diligence applies also to the selection of remedies. A veterinarian is liable for harm resulting from the curative or prophylactic agents he uses whether the harm result from a misuse of the agents or from a fault of the agents themselves, if he has not exercised due care and diligence in their selection. In short, the guarantee to the client that you are using due care and diligence implies that you are giving him the best you have and that the services rendered are those practical for the case in hand, and that your diagnosis and your treatments are based upon careful observations and an adequate study of the case.

On his part, the owner of the animal agrees to only two things. Let me emphasize this. The veterinarian gives five general guarantees with every call that he makes. The owner guarantees two things. First, that he will follow all reasonable directions of the veterinarian and render such assistance as may be possible. If he fail to do this, he cannot claim damages resulting from such failure, nor can he refuse to pay the veterinarian's fee because the outcome of the case is not what it should be. His second guarsonable fee such as would be approved considantee is that he will pay the veterinarian a reasering the services rendered and the customs of the community.

For any unusual service, it is always best to have an understanding in advance as to what the fee will be and upon this advance agreement, charges can be based, and collections made; but where nothing is said as to the fee, the charges must be reasonable and the court will decide what

is reasonable upon the testimony of what is customary for such services in that community, what has been charged previously and what others are charging. A veterinarian cannot get more nor can a client avoid paying this amount.

A veterinarian will not be held to have guaranteed a cure unless he specifically agrees to such a guarantee; i. e., a cure is not part of the implied contract of a veterinarian, and the payment of his fee does not depend upon whether or not his treatment effects a cure, unless he agrees to such a contingency.

Damaged Sweet Clover, the Cause of a New Disease in Cattle

Among many agricultural communities in North America an erstwhile noxious weed—sweet clover, has within a decade become recognized as a farm crop of remarkable value. The very general success of the crop has resulted in a tremendous increase in the acreage sown to sweet clover. In districts where the cultivation of corn for ensilage was threatened by the corn-borer sweet clover has been introduced as a substitute. On light gravelly soil where other crops frequently perished sweet clover was found to prosper. It is both chemically and physically beneficial to the soil, and in comparison with corn is more economical and convenient to handle in the production of ensilage. Under such circumstances the rumor that sweet clover ensilage and hay was responsible for the death of cattle in widely separated districts of the province of Ontario was a matter of much concern to the farmers and resulted in an immediate investigation by the Department of Agriculture through the Veterinary College.

During the winter months of 1921-22 many occurrences of a somewhat mysterious disease of cattle were reported to the college by local veterinarians. The early age of the animals attacked combined with the peculiar location of the subcutaneous swellings frequently resulted in an erroneous diagnosis of blackleg. When postmortem examinations were made the discovery of numerous large and small hemorrhages sometimes led to the verdict of hemorrhagic septicemia. Animals, which were apparently quite healthy, were reported as dying within a few hours after the operation of dehorning. A careful inquiry elicited the fact that in every case sweet clover had been included in the diet of the deceased animals.

Differential Diagnosis

The disease under consideration is frequently mistaken for hemorrhagic septicemia and symptomatic anthrax. The following table enumerates the points of difference between these somewhat similar diseases.

	Disease Investigated	Blackleg	Hemorrhagic Septicemia
Local lesions (swellings)	Non-inflammatory. No gas.	Inflammatory and emphysematous.	Inflammatory and painful.
Temperature.	Normal or subnormal.	Elevated.	Elevated.
Respirations.	Slightly increased.	Very rapid.	Very rapid.
General appearance.	Frequently normal till a few hours before death.	Acutely sick.	Acutely sick.
Visible mucous membranes.	Blanched.	Injected.	Injected.
The blood.	Pale and little tendency to clot.	Dark and coagulates readily.	Normal in color and coagulates.
The liver.	Shot with dark punctate hemorrhages (acute type).	No marked change.	No marked change.
The swellings.	Sero-sanguineous with the surrounding muscles pale. No odor.	Emphysematous, with the muscles dirty brown or blackish.	Sero-sanguineous, surrounding muscles normal.
Lymph glands.	Normal or edematous.	Inflamed.	Inflamed.
Organisms.	None present.	Bacillus chauveaui.	Bacillus bovisepticus.

It should be remembered that hemorrhagic septicemia and blackleg are not stable diseases, but pasture diseases. The feeding of damaged sweet clover will naturally arouse suspicion.

Treatment

The most valuable method of controlling the hemorrhage when the ordinary mechanical means cannot be employed is the injection of freshly drawn blood serum. The animals should be given plenty of water and laxative diet such as bran mash. It is of great importance to keep the animals quiet, as anything that causes excitement increases blood pressure and tends to facilitate hemorrhage.

Predisposing Causes

Age. Young animals are highly susceptible while the aged are markedly immune. This is well demonstrated in the Beeton outbreak. The animals were receiving damaged ensilage in quantities proportionate to their body weight.

	Total No.	Deaths
Animals between the ages of 6 months and 1 year.....	5	3
Animals between the ages of 1 year and 2 years.....	31	16
Animals over 2 years of age....	22	0

In one case a calf was born which within a few hours after birth developed typical symptoms and died, while the mother remained well. In another case an aborted calf showed well-marked lesions, the mother remaining perfectly healthy.

Etiology

There is no longer any doubt in the minds of those who have had experience with this disease that it is always associated with the feeding of sweet clover. The point of dispute is, the way in which sweet clover is responsible for the disease. In considering this problem, at least three possible ways suggest themselves. They will be briefly considered.

A.—Is sweet clover injurious because of a poisonous principle in the plant? In his book on poisonous plants Pammel makes the following statement in regard to the sweet clovers. "The sweet clovers contain the subsfance cumarin $C_9H_6O_1$ which is found in the Tonka bean, sweet vernal grass, vanilla grass, etc. In Europe the sweet clover is suspected of being poisonous. Some years ago the writer conducted an experiment in feeding considerable quantities of sweet clover, but without any injurious symptoms resulting. According to Freidberger and Frohner sweet clover causes paralysis of the muscles." Although suggesting its poisonous nature, Pammel gives no proof; he merely cites opinions. Numerous experiments of the writer all indicate the harmless nature of the plant. Calves and rabbits have been fed on an almost exclusive diet of good hay and sound ensilage over a period of many weeks with no ill-effects. One must also take into consideration the fact that thousands of farmers have been feeding sweet clover to their stock for many years with only occasional and localized outbreaks. There is the possibility that only at a certain stage of maturity does the plant become poisonous, or that only certain species are poisonous. Experimental work has practically eliminated these possibilities. The reasonable conclusion is that sweet clover can not be considered as a poisonous plant.

B.—Is sweet clover injurious because of a deficiency in some essential food element?

A chemical analysis of sweet clover shows that it contains carbohydrates, proteins, fat and ash in sufficient quantities to satisfy the requirements of the body tissues. It would appear to be a well balanced food, and not likely to cause such acute conditions as are seen in this disease. Again, the verdict of the majority of those who feed sweet clover is, that it is an excellent food for stock. If this were a deficiency disease then the worst cases ought theoretically to occur among animals which were receiving an exclusive diet of sweet clover. This has not proved to be the case. The worst outbreak was among cattle receiving only a limited amount of sweet clover, while a liberal quantity of grain and hay was included in the ration.

The evidence is entirely against the idea of a deficiency disease.

C.—Is sweet clover harmful because of poisonous products formed in it by micro-organisms?

In every outbreak investigated, as well as in the majority of reported cases, the sweet clover was found to be mouldy. A denial of the existence of mould was generally due to the fact that the mould was concealed within the hollow stalks and thus not immediately visible. It can be said emphatically that the disease is produced not by good, but only by damaged clover. The presence of moulds is absolute evidence that at one time the sweet clover was a suitable medium for the growth of micro-organisms. The large colonies of mould are easily seen by the naked eye, while the small colonies of bacteria which are undoubtedly present escape observation. Whether the moulds or the bacteria were the ultimate etiological factor was an interesting problem to be settled.

The fact that moulds and bacteria have been growing in the plant tissues brings with it the

possibility of the production of poisons, either directly as a specific secretion of the organisms or indirectly due to a splitting of the clover protein. The plant being a legume contains a large quantity of easily convertible protein (globulin) which is a real source of danger when infected with proteolytic organisms.

A very simple yet very significant experiment may be mentioned to advantage at this juncture. Good clover stalks and damaged clover stalks were hand picked from the same hay mow. The good were fed to one rabbit and the damaged to another. The rabbit which ate the good remained well while the rabbit which ate the bad died, showing typical lesions. This experiment was duplicated using a different sample of clover hay. The results were the same.

In determining the cause of the disease the available evidence points to a toxic substance, developed by the activities of micro-organisms, growing in the sweet clover, as the responsible factor.

Prophylaxis

The preventive measures suggested are based upon a belief that the disease is due to poisons produced by the growth of moulds and possibly other micro-organisms in the sweet clover. Whether moulds are alone responsible is a matter of little consequence from the standpoint of prophylaxis; they are always a danger signal. It is, therefore, a question of how best to prevent the development of these organisms. In the first place it must be borne in mind that the most important factors in the development of mould and bacteria are climatic, and thus outside the control of man. When the season is wet the hay is almost sure to be mouldy. The following practical suggestions are offered:

(1). Sow only scarified seed, and sow heavily, not less than twenty pounds to the acre. This will insure a heavy stand, and the stalks will be thin. Moulds develop most readily on tough woody stalks.

(2). The clover should be cut early, the most suitable time being when the crop is in bud.

(3). Cure the hay in large coils and never draw in to the mow when wet. Mould will grow luxuriously on stalks that have been thoroughly dried if these later become wet.

(4). Salt added to the clover at the time of stacking, in the proportion of about fifty pounds to the ton, seems to be very beneficial.

(5). The hay must be protected from moisture which during the winter months may rise from the cow stable and condense on the fodder in the hay mow. This is very important.

(6). In the case of ensilage, mould will not develop if the sweet clover is free from woody fibre, ensiled as soon as cut, cut short and thoroughly tramped in the silo. Exclusion of air in the silo means freedom from mould, and freedom from mould means freedom from disease. In every outbreak among cattle where ensilage was being fed the latter was coarse and dry, which had made close packing in the silo impossible.

(7). If any evidence of mould the hay should be fed sparingly and only to mature cattle and horses.

The making of hay from sweet clover is attended with real danger. No other hay crop becomes so definitely poisonous to stock when harvested under unsuitable conditions.

Conclusions

I. That the disease investigated is a new disease and, while simulating hemorrhagic septicemia and blackleg, is entirely distinct from these diseases.

II. That the disease is produced by a toxic substance which is present in mouldy sweet clover. There is much evidence that certain moulds are responsible for the formation of this poisonous principle.

III. That the toxic substance produces the disease by destroying or damaging the cells of important tissues and vital organs. This may result in hemorrhage, delayed coagulation of the blood, and destruction of the red blood cells.

IV. That there is no evidence to show that the feeding of good sweet clover hay or ensilage can produce the disease in question.

V. That the moulding of the hay and ensilage can be greatly reduced by observing proper methods of sowing and harvesting the crop.

—Report of the Ontario Veterinary College, 1923.

DISCOVERY OF VITAMIN REPORTED

It was reported in the daily press under date of March 20th that the vitamin substance had been isolated at Columbia University by Dr. Walter H. Eddy, Dr. Ralph W. Kerr and Dr. R. R. Williams. It is said to be an organic chemical structure composed of carbon, hydrogen, nitrogen and oxygen. The investigators are now engaged in devising methods for producing it synthetically. D. H. Killefer of the Journal of Industrial Chemistry, said that the isolation made by the three Columbia men was of major importance. So fugitive is the vitamin, he said, that lime juice known to be rich in vitamins, loses them after being boiled, although chemical analysis indicates no change.

Recent Developments in the Handling in Control of Animal Diseases

By E. J. Frick, Manhattan, Kans.

The purpose of this paper is to review some of the more important developments in veterinary medicine that have not as yet appeared in text books. There have been many discoveries and developments in the treatment of disease within the last year or two. For example: Sunlight treatment for rickets, treatment of vitamine deficiency diseases, rabies vaccine-single treatment, new drugs, such as Butyn, the local anesthetic, Neoarsphenamine, the new arsenical, and a number of others.

At present we shall discuss insulin, internal anthelmintics and the flavine dyes.

Perhaps the most recent and outstanding medical achievement of this age is the discovery of the usefulness of insulin in the treatment of diabetes mellitus.

Insulin

Diabetes mellitus is a disease of metabolism in which carbohydrate is not efficiently utilized by the body, thereby causing a derangement of the normal metabolism of proteins and fats as well as carbohydrates. This derangement is recognized by emaciation, voracious appetite, increase in percentage of sugar in the blood and sugar in the urine.

Removing the pancreas in dogs causes these symptoms to develop. The pancreas consists of two types of tissue: the glandular portion forming the external secretion and the insular portion known as the islands of Langerhans. In patients dying of diabetes mellitus these insular glands were known to show marked pathologic changes. The internal secretion formed by these glands is called insulin. It is carried to all tissues by the blood. The presence of insulin is absolutely necessary for the proper burning of sugars and fats in the animal body.

Rather definite physiologic units of insulin are prepared from the pancreatic gland for the treatment of diabetes mellitus. Brilliant results are obtained in human medicine in the treatment of diabetic acidosis and coma, patients recovering in a few moments.

However, insulin is not a cure for diabetes mellitus but must be administered almost daily and would have almost no practical value in veterinary medicine.

Internal Anthelmintics

Within the last two years, two very efficient anthelmintics have been developed, carbon tetrachlorid and arecoline hydrobromid. A review of the therapeutics of these should be of value. Carbon tetrachlorid (CCl_4) first discovered by Regnault, 1838, did not come into general notice till 1865 when it was suggested as an anesthetic by Simpson of Edinburgh.

Carbon tetrachlorid is a transparent, colorless, heavy liquid of characteristic odor and an agreeable aromatic flavor. Non-inflammable, it is immiscible with water but miscible with ether or fixed or volatile oils. It is extensively used as a solvent for fats and removing grease from garments, replacing petroleum benzin to an advantage because of its non-inflammability. It is commercially known for this work as "Carbona." As a solvent for alkaloids in assay work and in manufacturing work it takes the place of chloroform.

It is very valuable as a fire extinguisher and under the name of "Pyrene" is so used. A solution containing 4% of caoutchouc and 0.4% of iodin in carbon tetrachlorid has been used for the purpose of coating the hands of the surgeon with a sterile and impermeable covering. Carbon tetrachlorid has been suggested as an agent for surgical anesthesia but although the inhalation of it will produce complete unconsciousness, Simpson found that it was more depressant to the heart than is chloroform. Its vapor applied to the eye by sprinkling a few drops on the hands is asserted to be an effectual means of relieving some forms of conjunctivitis, ulceration of the cornea, photophobia, etc. Internally on the digestive tract, it has the same effects as chloroform.

Results on 50,000 treatments in both man and animals prove carbon tetrachlorid to be more effective against hookworms than chenopodium, thymol, beta-napthol or combinations of these. The principal use of carbon tetrachlorid in veterinary medicine is as an anthelmintic, especially against hookworms in dogs. In doses of 0.3 cubic centimeter or mil per kilo-

Presented at Kansas Veterinary Conference, Feb. 7, 1924.

gram or 1cc per 7 pounds of body weight, administered in capsules, it is more effective than any other known treatment against hookworms. It is relatively safe as large doses up to three times this amount give rise to no evident symptoms. Because of the possibility of impurities only a pure and carefully refined carbon tetrachlorid should be used. Care must be taken not to break the capsule in the mouth as suffocation may result. The use of hard gelatin capsules was found to be attended with danger and losses due to inhalation of the drug. These capsules being brittle were easily crushed by the teeth and were rapidly dissolved by the juices of the mouth, thus allowing the drug to escape with toxic and sometimes fatal results. The soft globules being tough and elastic are a decided improvement and besides their size and shape tend to prevent passage into the trachea. While carbon tetrachlorid deserves consideration with especial reference to hookworms, it is also very effective for removing ascarids, being somewhat inferior to chenopodium in this respect, and will remove whipworms, as other anthelmintics will, when it gets into the cecum. According to Jeffreys carbon tetrachlorid as given above will remove intestinal flukes from foxes and it may prove equally effective in removing these flukes from dogs. It is not of value against tapeworms.

Arecolin Hydrobromid for Tapeworms

The practical anthelmintic for use against tapeworms in dogs is the treatment developed by Lentz of Pennsylvania using arecolin hydrobromid in capsule by mouth. No purgative is necessary as the action of the drug usually passes the tapeworms in half an hour or sooner. This relatively rapid action with the sight of long strings of tapeworms gives a good ocular demonstration to the owner. The dose for small dogs is one-eighth grain, for average size dogs one-fourth grain, and large dogs can stand one-half grain.

The Flavines

Previous to the war the flavine products were made only in Germany and their value as antiseptics were but little known. During the war they were made by British and American chemists and their solutions were much used in wound treatment.

Acriflavine is diaminomethylacridine. Proflavine is diaminoacridine sulfate. There are many other compounds of the yellow dye group such as agroflavine, trypaflavine, etc., that are coming into general use. In human medicine, acriflavine today is almost replacing the argyrol and protargol treatment in gonorrhea.

The use of acriflavine and proflavine in bovine practice at this institution has extended over four years. The solution that apparently gave best results and was the most often used, consisted of one gram of acriflavine and five grams of proflavine to one gallon of normal saline solution. This is about a 1:4000 of acri- and 1:800 of proflavine solution. It should be kept in amber colored bottles as strong light tends to decompose it. For intravenous use fresh warmed solutions should be employed. To remove the stains on the hands wash with 1% bichlorid soap.

The flavines are antiseptic, not disinfectant in action. Inhibition of bacterial activity is the marked property of these compounds. The high bacteriostatic power and low toxicity to mammalian tissues of the flavines is of great value in the successful treatment of local infections.

There is complete absence of evidence of damage to tissues where the acri and proflavine salts are used in solution not stronger than 1:1000. They are not neutralized by admixture with body fluids such as serum, urine, etc.; therefore, they do not require frequent renewal. They possess a high diffusibility and will penetrate through the submucosa of the urethra and bladder. They are relatively non-toxic and non-irritating.

Regarding the clinical use of the flavine solution on bovines we have had very good results in the treatment of vaginitis cervicitis, metritis and the retained placenta. Thoroughly washing out the horns of the uterus, using the return flow irrigation method and a solution of one ounce of our flavine solution to a gallon of clean normal saline water. Where infection is severe a stronger solution can be used without danger of irritation. In conditions of septicemia such as metastatic pneumonia, etc., intravenous injections of the stock flavine solution are administered. The dosage will be dependent on the condition. Thirty cc. every two hours for a couple of days showed marked beneficial results in our hands. Local injection of infected quarters in cases of purulent mastitis with the regular flavine solution together with the internal administration of one ounce of formalin per os have given prompt recoveries. Puncture wounds of the udder responded well. As a wound dressing, wet flavine packs have given excellent results in recent wounds. There is an absence of toxicity in large wounds, prevention of suppuration and

spreading of sepsis and the primary dressing need not be changed for two or three days and then is easily and painlessly removed. The yellow staining property is proof of its penetrating power and has its effect on the owner.

In long standing stagnating wounds and in infections caused by Bacillus necrophorus we have found iodin and potassium permanganate solutions to be more effective than the flavines. For washing out wound cavities, open joints, etc., one ounce of flavine solution to a quart of normal saline has worked admirably.

When administered by mouth or intravenously, acri and proflavine appear in the urine in less than one hour and continue for 24 hours. They are of value in the treatment of purulent nephritis or cystitis.

In Belgium an acriflavine paste prepared by mixing 0.1% of acriflavine with sodium stearate is commonly used. Also a gelatin or starched mucilage containing 0.1% of acriflavine is extensively used.

Subcutaneous or intramascular injections of dilute proflavine and acriflavine 1:1000 solutions may be given in conditions where indicated. The flavines are not expensive when properly used; they leave no disagreeable odor on the hands and the stain is easily removed by means of bichlorid soap or solution.

In conclusion we reiterate we have found solutions of acriflavine and proflavine to be decidedly beneficial in recent wound treatment in uterine and other body cavity infections and when used intravenously in conditions of septicemia, pyemia, pneumonia, etc.

Catarrhal Mastitis of Cows*

By Dr. J. C. Sorensen, Idaho Falls, Idaho

Catarrhal mastitis which involves the mucous membranes of the milk canals, milk cisterns and teat canals, occurs more frequently than any form in herds maintained for heavy milk production. The frequency of its occurrence, together with the tendency to run a chronic course, which too often terminates in atrophy and loss of function, makes it of great importance.

Causes

The causes of catarrhal mastitis are numerous, the following being a few, which acting separately or together, may bring about the condition:

Traumatisms of any form, which may be external or internal as sequelae following operative measures on the teats or teat canals or following the treatment of parturient paresis.

Incomplete milking or irregular milking following the practice of some who "bag up" cows for sales.

Overfeeding or sudden changes in the feed such as silage and roots, are often followed by a number of cases, as in one herd which came under observation by my being called in consultation by the attending veterinarian, where following the feeding of carrots and mangels for three feeds, six cases appeared in a herd of eleven cows. Upon the feed being taken away altogether with treatment, the cases all cleared up and no more animals became affected, and when the carrots and mangels were fed in proper amounts, no more trouble developed.

Exposure to extreme heat such as fires, has been held responsible for cases which developed immediately following the fire. Exposure to cold such as lying on snow or ice, or even what seemed worse, on cement floors with insufficient bedding, fourteen cases having been observed in one herd of fifty-two head in six days following the placing of the cows in the barn over night after they had been allowed to remain out during the summer and fall.

Cases have also been observed following intestinal disturbances, such as indigestion and impaction, and if the feed is not withheld, these cases usually terminate in loss of function regardless of treatment.

From my observations, I feel that infection is the primary cause in but few cases. Infection usually is secondary after the resistance of the udder has been lowered by one or more of the conditions before mentioned. The organisms present in the milk appear to be unable to induce the disease without the help of some resistance lowering factors.

Symptoms and Course

In a big majority of the cases of catarrhal mastitis, there is no apparent swelling of the affected quarter or quarters at the beginning of the disease, and in the remaining, the swell-

*Presented before Idaho Veterinary Medical Association, Boise, Idaho.

ing is slight with but little pain on pressure.

The first symptoms will not be observed unless the herdmen or milkers are very observing. Namely, that in the first few expressions from the affected quarter drawn into the palm of the hand, the presence of small white flakes may be seen, or difficulty may be encountered in expressing the stream; or the stream may be deflected scattering over the milker. At times the animal that has always been gentle will suddenly kick when the first stream is expressed, showing a tenderness of the teat. This condition results from obstruction of the teat canal or from exudate which collects at the teat orifice.

Another early symptom that may be observed is that the stream of milk is not entirely shut off when pressure is released, the mucous membranes being swollen, which interferes with the closing of the sphincters of the teat orifice.

As the disease progresses, the inflammation extends to the secreting structures and connective tissue. Proliferation takes place, the mucous membranes become thickened, and upon palpation, a cord-like thickening can be felt running through the teat or small nodular indurations in the milk cistern.

The quantity of milk is very slightly altered at first, but later as the proliferative changes extend to the secreting structures, the quantity is diminished and if not checked a very small amount can be obtained. The quality, aside from the small white flakes at first, is normal, but as the secreting structures become involved, clumps of mucus which are grayish in color appear, which is followed by a watery or whey-like fluid.

In herds not under constant observation, the previously mentioned symptoms may not be present when the veterinarian is called, but the following condition may be found.

The quarter may be considerably enlarged, feel cold, pit on pressure, but may show no pain. The temperature may be normal or one or two degrees above. The appetite is good, the bowels tend to constipation with a general dullness of the animal.

In primary infections of catarrhal mastitis, the disease is ushered in which a high temperature of from five to seven degrees, trembling or shivering, skin cold, peristalsis absent, no appetite, hair on end, lacrimation and increased respiration. There occurs rapid swelling of the affected quarter which is very painful and hot, with an exudate similar to blood serum which contains lumps of pus. If treatment is not at once begun, the swelling becomes more firm, pits on pressure, and in a few days gradually diminishes, after which a more circumscribed area remains due to connective tissue induration, and later contraction results in atrophy and loss of function.

Treatment

Treatment consists in removal of the cause. Taking off feed followed by large doses of magnesium sulphate and some diuretic to deplete the inflammatory area, aside from which the writer has obtained good results in cases of the non-infectious type by using the following: sodium salicylate, four ounces; boric acid, two drams; given three times daily on a little grain, on which it is readily eaten; milking every two or three hours; bathing the teat in warm water and massaging with some ointment; or, in some cases, applying Antiphlogistine to the quarter, and the injection hypodermically of from twenty to forty c.c. milk drawn from the affected quarter, every other day.

In the insidious infectious cases, using two ounces of ether per quarter daily with hot fomentations and massage, together with the aforementioned treatment, has given very satisfactory results, with the temperature dropping to normal in from twenty-four to thirty-six hours and the exudate returning to normal.

In cases which tend to become chronic, some results have been obtained by applying turpentine, four parts, and iodin, two parts, twice daily until the skin becomes tender, and repeating in a few days.

With this line of treatment used on forty-six cases, the writer obtained thirty-four complete recoveries, six partial recoveries with slight secretion, four cases of atresia of the teat canal, two of which responded to surgical measures, and two with atrophy and loss of function.

Up to the present only two diseases—fowl plague and lung plague of cattle—due to invisible viruses, have been found capable of being cultivated on artificial media. But, on the other hand, there are other filtrable virus diseases, such as rabies, smallpox, cow-pox, sheep-pox, horse-pox, cattle-plague, and hog cholera, that can be treated successfully with attenuated virus or a mixture of virulent blood and hyperimmunized serum.—The Veterinary Record.

A Common Sheep Trouble

By E. T. Baker, Moscow, Idaho.

In the spring of the year, when the roads are almost impassable, sheep owners are calling up practitioners with the following sad tale of woe:

"Say Doc, come right out to my place; got a bunch of sheep down an' they can't get up."

As the voice over the phone emanates from the larynx of a good paying client, we naturally make the trip. When we arrive, here is what we find:

One or more fine ewes paralyzed, some lying on their sides and some able to keep on the sternum. A very vague history is given, which usually amounts to this:

Several days before, one or two ewes were noticed standing back from the feed rack. The next day, they had diarrhea, staggered when they walked, and looked in general like the witnesses in an oil investigation. Yesterday, they were unable to get up, and several more coming down; the owner thought it would be a bright idea to call out the veterinarian and give

First Stage—paralyzed sheep. Stercoremia or impaction in pregnant ewes, causing a rapidly progressing septicemia.

his intellect something to do. Sometimes there is a watery discharge from the eyes and nose; sometimes there are injected mucous membranes, and sometimes the only visible symptom is a sick sheep, and a very sick-looking farmer.

The temperature per rectum will be about 104, and at first thought, our expert practitioner will be undecided whether it is hemorrhagic septicemia or rinderpest. He assumes a

Second stage—paralyzed sheep. This animal was lying on its side looking like a principal in an oil probe. It died next day.

very judicial appearance, like a small town chief of police when arresting a speeder from a neighboring state, and wonders what in heck the trouble is.

If he would only consider the peculiar temperament of the pregnant ewe it would give him a clue. As pregnancy advances she abstains from cold water, as it seems to give her a lamb colic. Then impaction of the rumen, and more or less paralysis of the abomasum takes place. The inflammation now spreads to the intestinal tract, and in a short time the ewe is absorbing her own toxins as well as from the fetus.

If the temperature is 106 or more, suspect an infection. In some localities, internal parasites may be a contributing cause, but nine times out of ten, it is too little water. Then add to this a ewe's natural craving for sour straw, spoiled fodder, frozen grass and the like, and you have a composite picture of forage poisoning, gastro-intestinal impaction, auto-intoxication and puerperal septicemia.

The treatment is very successful in those that are down. Take a sharp butcher knife, with a long point, insert it in the jugular fur-

row, and then make one slash out through the skin. Then bend back the head, until the vertebrae crack, and the victim is mercifully released from her suffering.

In those that are "staggery" but not down, one may give mineral oil, or the potassii bitartras et antimonii chloridi treatment in five grain dosage. A rectal injection, with a hypo of camphorated oil is also indicated.

Suggest a ration of oats and bran; water with the chill off; plenty of exercise, and feeding each morning before turning out. The writer, as a routine treatment in small flocks, administers mixed ovine bacterin, and sometimes results may be very pleasing.

Bruce of Canada has called this condition "stercoremia," but if you use this word on a rancher be sure and charge five dollars more.

Practical Value of Serological and Other Tests in the Control of Abortion Disease

By Prof. Charles H. Kitselman, Kansas State Agricultural College

The subject of abortion tests narrows down to the complement fixation test and the agglutination test.

1. Complement Fixation Test. This test is used with a few exceptions only in experimental work and is not the test used in diagnostic laboratories. There are two good reasons why the complement fixation test is replaced by the agglutination test:

1. It is quite complicated and requires far more skill and laboratory material to run.

2. It is not considered quite so sensitive in picking out infected animals as the agglutination test.

2. Agglutination Test. This test is quite simple to make and because of its simplicity is not subject to the errors of technic of the complement fixation test. It shows a higher percentage of infected animals.

Technic: We usually run four dilution tubes in this test:

Tube 1—contains .01 cc. of serum
Tube 2—contains .005 cc. of serum
Tube 3—contains .002 cc. of serum
Tube 4—contains .001 cc. of serum

1 cc. of standardized antigen is added to each tube making the dilution read 1-100, 1-200, 1-500, 1-1000.

Interpretation of Reactions: Laboratories over the country generally consider a blood sample positive if it reacts in a dilution of 1-100 or higher, although there are some laboratories using a dilution of 1-80 as the lowest tube for a positive.

A normal cow is not considered to react in dilution higher than 1-40. No difference seems to be observed in favor of using a polyvalent antigen instead of a single strain antigen. We have used a ten strain antigen and have obtained the same results in using a single strain antigen.

Applying Tests to Individuals: A cow showing a reaction of 1-100 shows the presence of anti-bodies in the blood, which we consider evidence of infection at some time or other.

This reaction cannot be correlated with the past abortion history of the cow nor have we been successful in using it to mirror the future calf crop.

This absence of correlation is true in the higher dilution of 1-200 or even as high as 1-1000. Time after time we have tested blood from cows having positive history of abortion and have not demonstrated a positive reaction. In these cases we like to retest such animals after four weeks have elapsed, because there is some evidence showing that an aborter will go positive after that time, but may be negative at time of abortion.

One theory advanced to explain this situation is that the abortion is due either to other bacteria or to falls, etc.

The agglutination test is of value in determining herd infection and the extent of such infection when the history of abortions is available, together with a report of the bacteriological findings on the aborted fetus, afterbirth, or vaginal discharge.

Herd Separation on Basis of Agglutination Test: Some states advocate dividing a herd into positive and negative reactors, so that the healthy animals will not mingle with those carrying a positive blood test.

Herd division necessitates additional labor and equipment. Animals giving a positive titre

should be handled either by separate attendants or after the clean animals have been attended to.

The aim is to dispose of reactors as soon as possible without too great a financial loss. Of course, the negative animals should be tested several times a year and in case any of them goes positive they should be immediately put in the positive herd. Aborters even though they are negative should be removed from the healthy herd and either isolated or put with the reactors.

State Abortion Laws: Georgia has a law in effect which requires all animals shipped into the state to be subjected to the agglutination test for infectious abortion of cattle. Animals carrying a positive titre are forbidden entrance to the state. Several states at the present time are contemplating similar regulations governing the shipment of animals suspected of being infected with abortion disease.

Our opinion at the present time is to the effect that all such regulations are premature and may work a hardship on some breeders.

The Raising of Poultry and Conducting a Poultry Practice

By W. E. Norden, Avoca, Iowa

More interest in poultry and poultry products is being shown from year to year. Many farmers a few years ago considered poultry as a necessary evil and not in any sense of the word as a source of revenue. There are as yet a considerable number of this class, but more people find that the keeping of poultry is profitable and enjoyable. In the last five years large hatcheries have sprung up in all parts of the United States that use eggs by the ton and send baby chicks to all corners of the world. This alone is bound to stimulate the poultry industry.

Only a few years ago California was the only large source of the egg supply for the east. It was not long before the east woke up to the fact that it could produce eggs cheaper than the west and they are now the brown egg people. The middle west which has an ideal climate and plenty of all kinds of grain will soon learn that it can easily compete with both east and west and it is rapidly coming to it.

It is unfortunate that in a large number of cases veterinarians as students did not have the opportunity to study poultry either from the anatomical, pathological or production standpoint. Only in recent years have the up-to-date schools added poultry courses to their curricula. Advice on proper feeding, housing and culling are fields by no means beyond the scope of veterinary practice. More than likely poultrymen will discuss disease at the same time with the same person with whom he is discussing feeding, culling or breeding. Furthermore, he will discuss these subjects with anyone interested or capable of giving advice or suggestions.

Presented at Missouri Valley Veterinary Association Meeting, Feb. 19-21, St. Joseph, Mo.

I notice in my practice that I get several calls from poultrymen from other towns where their veterinarians have taken no interest in poultry. Not only do I get their poultry work but quite often I get other veterinary work from them.

Poultry Culling

I think that every veterinarian should acquaint himself with poultry culling. It does not require a lot of study as the average man or woman can master the more important features of the work sufficiently to remove with ease and efficiency the poor hens of the flock.

Culling alone nets a much better and nice income every year; besides, it comes in very handy to know how to cull out non-layers as well as inferior stock when putting on the T. B. test and similar work.

Housing

Poultry housing takes in light, sanitation and ventilation. This is one place where I find I can help a farmer by discussing various plans of building. Most of the time I find the layman does not know what he really wants and generally he shuts his eyes and lets the carpenter build what he likes. Results are that when the building is finished it is thirty feet long and all the way from ten to fourteen feet wide and the windows are as high as he can get them. No thought was given to the suggestions of the state poultry extension department.

Narrow houses with open front are not advisable. Owing to the fact that should there be a direct wind blowing from the south, the birds cannot get back far enough to be out of the draft. If a smaller house than twenty by twenty is desired, it should be built, say, twenty feet deep and ten feet wide, rather than ten feet deep and twenty feet wide. The width across the front should never exceed the depth. A deep straw shed with open front makes an ideal house for capons. They have plenty of ventilation and light, and that is what a capon wants.

Feeds and feeding is an important subject and a veterinarian should acquaint himself with the scientific side in order to serve his client the best in the many factors in poultry feeding. There is a book written by John H. Robison fully illustrated, that takes in the practical rules of feeding and how to adapt them to individual requirements. It is a text book for a beginner and a reference book for the expert. This book can be had for $1.25 by writing Reliable Poultry Journal Publishing Co., Dayton, Ohio. "Poultry houses and fixtures," fully illustrated, for $1.00 can be had from the same address.

Hatcheries

There are a few good hatcheries but many are not. My experience with hatcheries has been very discouraging. There are a number of causes that kill the baby chicks. The first three days after being hatched, many die, caused by chilled eggs, weak embryo and a number of other causes, but I do blame the hatcheries when they send out chicks that they well know will not live more than three days. That I absolutely know is done by some. Last year I bought 3300 baby chicks for myself, besides several hundred for farmers in my community. I purchased two orders of which 200 went to one man in my town and 250 to a man about four miles from here. The two hundred that I sold to my customer in town started to die the second day and in four days they were all dead. The other 250 were all dead in a week. I went to both places several times and tried my best to save at least a part of them but I could do nothing. I went to learn what I could about the hatcheries. The hatchery I gave the 450 egg order to had 15 or 16 mammoth Buckeye machines with a capacity of 15,000 eggs each. I asked the foreman how he was able to fill those machines with eggs and he told me that he found about as good results were obtained from cold storage eggs as from fresh eggs. There is no question about that, but what could the consumer do to keep them alive after he received them?

I visited another smaller hatchery in a nearby city, and it had ten 250 egg machines in the basement with only two small windows and a door for ventilators. Each machine had a separate lamp which consumed more than its share of oxygen. The eggs were never ventilated from the time they were set until hatched. (That is, I mean outside the machines).

Conditions like this I found in nearly every hatchery that I visited. Hatcherymen and breeders in Illinois have established accredited hatcheries and flocks, following the plan of Wisconsin where the day-old chick business is officially supervised by the state bureau of markets. In Illinois, it is planned to include agglutination tests so that accredited flocks may be certified by the state veterinarian as free from baccillary white diarrhea.

A number of meetings were held in different parts of the state during November to acquaint poultrymen, county agents and veterinarians with the plan. This is a very good move and I hope that in the near future every state will adopt this plan.

The poultry industry has grown immensely and has had a career quite like the pork industry. It first was ridiculed and then as people realized the profits to be had from the industry, more engaged in it, and with more poultry being raised in smaller places, disease increased rapidly. For that reason also, poultry culture should be a part of the course available to all veterinarians.

Feeding and Care of Chicks

I think that there are more chickens killed by not being properly fed and watered than from any other cause. Some of the things that kill baby chicks are as follows: weak embryo, incubator not operated properly, chilled eggs, and eggs that have been abused in various ways. No medicine will do any good under such circumstances.

A chilled chick is the same as dead. The temperature of the brooder should be 100° F. two inches off the floor the first week, 95° F. the second week, 90° F. the third week, lowering the temperature each week by five degrees.

I believe that many baby chicks die from over-feeding or the use of improper feed. Always use a good clean starter, being sure that it is not musty or moldy. The poultry extension department of every state gives a formula of a good starter, but the trouble is that most

of the farmers never look them up. I had good results using the Ames (Iowa) method of starting, but this year I think I will use a ready prepared starter.

I am not an advertising agent for the Quaker Oats Company, but they put up a starter called "Full-O-Pep" that looks good to me. I should like to hear from anyone who has tried it.

Above all other things, in feeding baby chicks, be sure that they have a trifle less feed than they really would eat. They should always be glad to see the feeder, but then they should be old enough and should immediately go to scratching as soon as the chick feed is given. A good mash should be kept before them all the time, together with plenty of fresh water.

Poultry Diseases

Unlike other animals, it is seldom that the external symptoms are so strongly marked as to present conclusive proof of the type of disease afflicting the birds of the flock. It is necessary to conduct a postmortem examination of the diseased specimens. This is easily done, and I take it that most veterinarians know how to go about it.

White Diarrhea

This disease kills many chicks. The trouble begins about the fourth day and lasts to seven days. Some of the chicks have a thin, white discharge from the vent and others don't. The chicks are not active and have a stoopy look; also, the head appears to be set back towards the body. One thinks the chick is cold and in great pain. Some get in the warmest spot under the hover; others have intense thirst.

Treatment: Sulphocarbolate in drinking water sometimes gives good results. Sour milk is good. A tight box with the chicks in it and ten cents worth of chloroform is the best treatment. Chickens with white diarrhea invariably contract roup, cholera or some kindred disease; they are stunted and never do well. The best method is to get rid of them at once, for they never are good for anything.

Tuberculosis

It is fortunate that the disease is chiefly confined to adult birds. By strict culling out of the non-layers as well as adult birds, the disease can be held to a minimum. Practically all classes of birds with the exception of ducks have been known to contract the disease. Usually during the spring or fall of the year, the poultry keeper has more or less trouble with roup, diphtheria, sore head, etc., with his flock. These diseases are usually the neglected colds caused by crowded sleeping quarters, roosting in drafts or in too warm a house without sufficient air or by various complications of infection on the premises. I get a number of calls to treat a condition of this kind and first of all I recommend the cleanliness, light and ventilation treatment, together with some good antiseptic in the drinking fountain (sulphocarbolate with mercury is a good one).

Chicken Pox

The disease spreads rapidly by contact. Wild birds and parasites may serve as carrying agents and thereby assist in spreading the disease among the flock.

Treatment: Isolate diseased birds; remove the crust of nodules; treat with corrosive sublimate, 1-1000, dust with iodoform, or swab the affected parts with the following simple remedy:—common salt, 1 teaspoonful; vinegar, 1 teaspoonful, carbolic acid, 1 teaspoonful and 1 pint of boiled water.

Fowl Cholera

This is a virulent, usually fatal and highly infectious disease. It may be acute, in which case several die in a few hours, or it may be sub-acute. The birds linger for several days.

Treatment: Look after sanitation first of all; the disease is spread by contact with infected birds and drinking water used by an infected flock. Occasionally apparently healthy birds may serve as carriers and yet never show any outward effects from its presence. Clean and disinfect buildings; kill all infected birds, being careful in not drawing any blood as it is charged heavily with bacteria and may infect the entire flock. Thirty grains sulpho-carbolate with eight grains of mercury to one gallon of drinking water is good, or one teaspoonful of permanganate to four gallons of water has proven its value as a treatment. A good tonic is always indicated in all contagious diseases.

Vaccinating

I vaccinate for such diseases as roup and pox and think I get results with mixed bacterins and attenuated chicken pox scab. Poultrymen demand vaccination for their poultry and if you do not do it, they will send for vaccine and syringes and do it themselves. Veterinarians should be careful in staking their reputations on results following the use of biologics, however.

Goose Septicemia

Geese are particularly susceptible to a certain strain of cholera organism.

Methods of control: I have had best results by removing the geese that are healthy from

the range, dividing the flock and placing them in some dry, clean sheds for a few days. Put a 30-grain tablet of sulpho-carbolate in a gallon of water to drink; never use mercury-bichlorid in treating geese.

Rats and Cats

When rats or cats get started on chicks, you will have bad luck until they are all killed. A person can tell which one is working by examining the parts of the carcass left. When cats get into a flock of chicks they will chew up as much of the meat as they can, leaving the head, wings and legs. Rats on the other hand will pull off the head and sometimes the wings leaving the rest of the carcass intact. Kill all the stray cats and cover all openings in the brooder with one inch mesh wire. Gas the rats with the Ford. This I have done and it works. The rats that are not killed by it will leave after being gassed a couple of times.

Another thing to watch out for is wild birds, particularly hawks and bluejays. We all know about hawks. The jays will fly down, pick out the eyes of a young chick, or dig out its brains from an opening made on top of the head, and then fly away.

Obtaining Information on Poultry Culture

In conclusion, I would say that the best way to learn more about diseases of chickens is to attend the short course on such subjects given by the agricultural colleges and get literature from their extension department if you cannot attend in person. The department of pathology and hygiene of the Missouri State Poultry Experiment Station, Mountain Grove, Missouri, is sending out circulars to the veterinarians and practitioners of the state dealing with diseases of poultry. The Missouri State Poultry Experiment station takes the attitude that the control of poultry diseases should be handled by veterinarians in a manner comparable to diseases of other animals.

Indiana Poisonous Plants

By L. H. Pammel

Professor Albert A. Hansen, an extension professor of Purdue University has favored me with a series of seven articles. "Facts About Indiana's Poisonous Weeds." Two of the articles discuss white snakeroot as a most dangerous plant in Indiana. White snakeroot should be completely destroyed; an article on cowbane "Deadliest Plant in America grows on Hoosier Farms," one on poison ivy "Harmful Effects of Poison Ivy not to be Underrated," one on ergot, "Ergot Causes a Strange Disease of Animal and Man;" one on wild cherry dangerous to stock and one on "Jimson and Cocklebur Common Source of Danger." I do not know whether these articles can be obtained from the author or not, but presume they can. They were published in the "Indiana Farmer's Guide" of Huntington, and are splendidly illustrated.

White Snakeroot

In regard to white snakeroot Prof. Hansen says: "White snakeroot is a poisonous weed of woodland pastures that is common in all parts and is capable of causing trembles, a disease that is fatal to grazing animals. Last year (1922) white snakeroot was found on 12 Indiana farms on which 47 sheep, 19 cattle and 10 horses died, apparently from plant poisoning.

"Experiments have demonstrated that the poison may be carried in the milk and there is little doubt that the disease known as milk sickness in man is caused by poisoned milk from animals that have grazed on white snakeroot. A number of human deaths from milk sickness have been reported in Indiana during recent years. Experiments at Purdue have proved that the plant is also dangerous when fed dry in hay. The cause of trembles and milk sickness has but recently been satisfactorily demonstrated, although white snakeroot has been under suspicion for many years."

Symptoms of Snakeroot Poisoning

The symptoms described by Professor Hansen are as follows: "The symptoms of white snakeroot poisoning in sheep and cattle appear to be very similar. The animals first become sluggish and listless. This stage was aptly called the spring-fever stage by O. T. Sperrel of Floyd Knobs, who suffered loss from this cause. Other farmers have termed it the lazy stage. Severe constipation usually develops, followed by violent trembling, which has been facetiously alluded to as the "shimmy" stage, a rather descriptive name. The "shimmying"

may be brought on earlier by driving the "lazy" animals. The breath frequently becomes foul with a peculiar repugnant odor. The joints eventually stiffen, causing a difficult gait and the animals fall, showing great disinclination to rise or otherwise exert themselves. This stage is usually followed by death from general exhaustion. The trouble usually appears in Indiana from the first of July until winter.

"The only data available concerning the symptoms in horses are the result of observations made during the Purdue experiments conducted by Dr. Craig, who is chief of the veterinary department. The trembling stage, which is so characteristic in sheep and cattle, appears to be entirely absent. The affected animal becomes listless, a peculiar catch may sometimes be noted in the gait if one observes closely, the face takes on a rather forlorn expression, the entire attitude is one of dejection, the throat muscles may become paralyzed to the extent that swallowing is difficult and the animal eventually falls and death soon follows."

Cowbane Poisoning of Hogs

Recently I had a note on cowbane causing poisoning. Prof. Hansen describes poisoning of hogs from cowbane. I do not recall having seen anything published on this plant causing poisoning of hogs. His note therefore is of interest.

"One night last summer, Frank Kayser, a Clinton county farmer, heard strange noises emanating from his hog lot. The sounds indicated that some one was running about wildly and frantically and weird shrieks and groans made the welkin ring. Next morning Mr. Kayser ventured forth on a tour of investigation to ascertain the cause of the strange commotion. Five of his prize hogs lay stiffened in death in all corners of the hog lot.

"Mr. Kayser's case is typical of a number of others unearthed last year during the course of the poison plant field investigations that were conducted by the agricultural extension department of Purdue University. Water hemlock, the most dangerous of all poisonous plants, was located on a half dozen Indiana farms on which 10 sheep, 5 hogs and 6 cattle died during the year, apparently from the effects of hemlock poisoning."

Mr. Hansen found an abundance of the cowbane growing in the ditch used by the hogs.

Ergot and Cherry Poisoning

The article on ergot calls attention to a parasitic disease of rye which was once common in Indiana. The disease ergotism is said not to be common in Indiana. Of the cherry the author says.

"Animals suffering from cherry poisoning first show signs of dizziness, which is followed by dilation of the pupils of the eyes, and violent convulsions. The victims finally become paralyzed and die."

Poisoning from Coffee Leaves

"Speaking about the danger from fallen trees brings to mind the rather unusual case of Lora Forkner, of Tipton county. During a heavy wind a Kentucky coffee tree in his pasture was blown down. Shortly afterward a number of sheep died in the pasture and Mr. Forkner became suspicious of the fallen tree. His suspicions were well founded since the leaves and the fruits of the Kentucky coffee tree are poisonous, so much so that decoctions made from bruised leaves of this plant have been used to poison flies."

Then he calls attention to the poisoning from coffee bean, buckeye and horse chestnut.

He also mentions a case of poisoning from oak sprouts due to tannic acid.

Jimson Weed Poisoning

Mr. Hansen mentions an interesting case of hog poisoning from jimson weed. These cases are not common, though jimson weed is often common in hog lots.

"Hogs were dying in a mysterious manner on the farm of John Effinger of Vanderburg county, during the hot October days of last summer. The grass had given out in the hog lot and the heavy hand of suspicion pointed to the only green thing that the hogs could eat—common old jimson weed, which grew in profusion in the hog lot.

"The suspicions were pretty well confirmed a few days later by Dr. G. E. Norman, a veterinarian of Jasper. John Rose, a farmer of Alfordsville, had several sick hogs, three of which died. The cause was a bit difficult to fathom, but suspicion was cast on jimson weed which grew abundantly in the hog lot. Accordingly Dr. Norman posted the dead hogs, and the only material found in the stomach was corn, coffee grounds and jimson weed. Since the flowers, seeds and young leaves of jimson weed are known to contain an active poison, the trouble was not difficult to diagnose after the contents of the stomachs of the poisoned hogs were revealed."

Although jimson poisoning among farm animals has been found only in hogs in Indiana, the Colorado station reports that cattle have

been poisoned in that state by eating the leaves of young plants. There are cases on record in which grazing animals have been poisoned by eating dried jimson weed leaves in hay, but ordinarily farm animals are quite resistant to the poisonous action of the plant.

The Diet of Dogs in Health and Disease*

By George Watson Little, D.V.M., New York, N. Y.

There is no one subject pertaining to canine medicine that has been more neglected or less considered to be important than dietetics. Indeed, it is considered to be of no importance by many canine specialists, who seem to think that a dog has the ability to digest any food material. As a matter of fact, the correct feeding of dogs is the key to prevent, alleviate and possibly cure a host of conditions and diseases which are caused directly or indirectly by improper feeding.

Black Tongue a Deficiency Disease

Perhaps this statement can be illustrated best by the theory just advanced that "black tongue" or Stuttgart's disease is caused by a restricted diet and excessive work or exercise and that it resembles pellagra in the human being. This theory seems a most reasonable one when we consider that dogs in the South are restricted to cornmeal mush for food and dogs in the North to an exclusive diet of dog crackers. "Black tongue" is not uncommon in the North during the summer months, principally affecting aged animals.

Educating Clients in the Matter of Feeding

I have been trying for years to educate my clients in the ways of proper feeding of their pets. I have distributed over 50,000 copies in my private practice of a pamphlet entitled "A Dietary for Dogs." I have written similar pamphlets for the humane societies and one pamphlet on "First Aid to Small Animals" for gratuitous distribution by the American Humane Association. Over a quarter of a million of these pamphlets have been given away by humane societies in all parts of the United States and Canada. A skeleton dietary is printed in the back of this pamphlet. I shall continue to distribute these pamphlets, for if a man owns a dog and thinks a great deal of him, the first question he will ask the veterinarian is how to feed him. He should know that certain foods are bad and indigestible, causing toxemia and its long list of complications. He should know just what to feed his dog, and the dangers of improper feeding should be impressed upon him. Yet, where can one find any literature on dietetics for the dog? With the exception of the pamphlets that I have written, you will look in vain.

Preventive Medicine

We have reached the age of preventive medicine in all its branches relating to cattle, horses, hogs, sheep, goats and poultry, and we have just begun to realize its possibilities in the dog and cat. Preventive medicine is a broad subject, not being confined to the field of serum and vaccine therapy. It includes not only the subject of dietetics but hygiene, breeding and many other things that the owner of a dog should know. Today he must take the advice of the dog breeder, kennelman, dog dealer or use his own judgment in these things. The specialist in small animal practice is rarely consulted about the evils of inbreeding, care and feeding of the dog but is called only when the damage is done, and he is then expected to perform miracles with the poor, inbred, weak and toxemic specimen that is brought to him.

It is our own fault that we do not teach our clients the error of their ways. No one likes to be accused of losing a valuable dog and invariably the doctor is the one maligned, when many times proper advice would have prevented the disease or condition from which the dog died. One often hears the expression, "That doctor killed my dog!" Was he to blame or are we all equally at fault? For my part I would much rather prevent disease than to try to cure it. One does not lose but gain by this policy in the end.

Prevention Should Begin Early

Since the advent of the police dog in this country, there was never more attention paid to dogs in their care, training and breeding. We see some very fine, wonderfully intelligent specimens of this breed. In fact, it is claimed that we lead all other countries in having the best dogs, better than Germany even.

*Presented at New Jersey Veterinary Medical Society meeting, Jersey City, N. J., Jan. 10, 1924.

Also, we do see some very poor specimens of police dogs; some the result of interbreeding; but more the result of improper care, feeding and worm infestation. We see some dogs that are actually dwarfs as compared to the champion bred animal. Yet, as puppies these very same dogs could have been developed into marvelous, rugged specimens of the breed if only the owners had known the rudiments of proper care and feeding.

The natural resistance of any puppy depends greatly upon his early start in life. As soon as he leaves the mother to shift for himself, his trouble begins. He readily becomes the victim of worm infestation, the ova being introduced into the alimentary tract in various ways. From this age and from this point, the science of prevention of disease should begin. It does not begin there in most cases, however, but at the age of three or four months, when the dog reaches his permanent home after having been handled successively by the breeder, the dog dealer and finally into the hands of the owner, who no more understands how to care for the puppy than a bachelor knows how to care for a baby.

In the meantime the puppy's resistance has been decreasing rather than increasing. The breeder may think it is necessary to give a patent vermifuge without knowing the purpose for which he is giving it. He can only surmise, being profoundly ignorant as a rule, that there are other varieties of worms besides round worms and tapeworms. The dog store dealer does not want to worm the dog because the puppy will not swell up like a balloon unless he has worms. It is the dealer's business to sell fat looking dogs, and therefore his limited patent medicine knowledge is not employed unless the puppy contracts a cold, not distemper of course.

No dog dealer ever had distemper on his premises! According to their statements, they never have owned or sold a dog with that disease! The future owner finally obtains the puppy with a guarantee that the animal should live to a grand old age. He is lucky if he lives a month, for the poor man has bought only half a dog. The dog gets sick, precipitated possibly by an overloaded stomach of improper food or a bath or some other thing. The dog dies, and the owner's money dies with it. Redress? There is none. The dog dealer assures the purchaser that the puppy was perfectly healthy when he left the store. The owner has no way of proving one single thing. The dealer is safe under the law. No one can touch him except the department of health or the humane society. It is no exaggeration to state that 50% of all police and chow puppies purchased through these channels die before the owners have owned them two months. Now then, what is the solution?

Prospective Dog Owners Should Consult the Veterinarian

The prospective owner should go to his veterinarian reasonably assured that he can buy a dog free from worms, free from exposure to distemper and otherwise healthy and rugged.

Mess Time

The doctor has an obligation to perform which will everlastingly reflect to his credit. Yet, how many doctors take advantage of this golden opportunity to obtain the confidence of one more client and three or four more by recommendation?

We proceed to advise the owner that if he wishes to buy a dog the animal must be examined physically first and an analysis is made of the feces in order to detect the eggs of hookworms, whipworms, ascaris, echinococcus and other varieties of tapeworm.

The first snag is encountered, for the dog dealer suspects something right away and refuses to have his dog examined. If every doctor should advise every prospective owner this way, the dog dealer would finally submit his dog to this examination. It does not necessarily mean that the dog would be condemned. The owner is entitled to know just what he is getting for his money, and then the doctor can

proceed with his measures for worm eradication, intelligently proving, not guessing, that he is right. His very unconscious cocksureness will impress his client and win his confidence.

The next step is to eradicate the worm infestation and immunize the dog against distemper, explaining that if the dog has not already contracted this dreaded disease, it will prevent its symptoms from developing. If the dog already is in the incubative stage, it will minimize the severity of the attacks. Then and finally, the owner is advised specifically how to feed the dog, writing out for him the foods that are permissible, the amount and frequency of feeding. It is made perfectly clear that all has been done thus far that is humanly possible to increase the resistance and provide for the dog's future health and natural growth. Many things can happen that will destroy all that we have tried to do. The prospective owner has received his first lesson from which he may proceed, being reasonably assured that he has been given a square deal and that his chances of raising his puppy are good. If the pup does grow to be a wonderful dog, the owner will never stop singing your praises.

A Dietary for Dogs

This is an exceedingly difficult task to condense into the confines of a few pages. The most we can expect to do is to point out the prohibited foods, undesirable foods and those most desirable. Their amounts, frequency of feeding and many other things, depend upon the breed, age and size of the dog. We are dealing with all breeds of dogs from the twelve-ounce Chihuahua to the 210-pound St. Bernard. We are dealing with the long-legged awkward Russian wolfhound puppy and the squatty badger. We must consider environment, temperament and the ability to promote or retard growth by proper feeding. Collectively, including all breeds, a general dietary is a hard proposition to compend. Singly, referring to one breed and individual, it is a simple task. I shall attempt to explain some of the things to which I have referred.

A general dietary, to my mind, should discuss, first of all, the chemical composition of foods. It should be followed by statements to the effect that the diet must be chemically adequate, physically suitable and adapted to the peculiar organization of each animal, best expressed in the term "palatable" or to the animal's liking. Milk and its value as food should be explained. The fallacy that it is the cause of worms should be broken down. The fact should be explained that the dog is naturally carnivorous and that by environment he acquires the omnivorous habit of eating mixed foods. It should be explained that no dietary for health, at least, is complete from which meat is excluded, an exclusive flesh diet being the other extreme.

Clients Should be Warned Against Fakers

Reference to the importance of strict diet in disease as prescribed by the small animal physician should be emphasized and the dangers of feeding certain foods during sickness. The client should be given some idea of the dangers of the excessive use of drugs and of the use of patent medicines. He should be warned against the tricks of the unscrupulous faker who calls himself a doctor, who will place a key under a dog so that it will show a foreign body on the X-ray plate, who will perform a fake operation by incising and suturing the skin in the abdominal region so as to make it appear that actual laparotomy was performed, who employs chiropractic methods upon dogs, closing his eyes completely to his former anatomical training. All of these things are necessary for the introduction, for the layman should know where we stand, whether we are members of an honorable profession or just plain fakers, quacks or morons.

Dietary According to Breeds

Then we proceed to the classification of the breeds of dogs into five or more classes in order to divide and subdivide the foods suitable for each breed, size and age of dog.

Class I

For the following breeds, weight 80 to 210 lbs., St. Bernard, Great Dane, English Mastiff, Italian Bull, Newfoundland, Borzoi or Russian Wolfhound, Irish Wolfhound, Bloodhound, Deerhound.

Meat—Beef, lamb, mutton, beef heart, sheep's heads, bullocks' heads, large slim bones, raw beef. Amount—One and a half to two and a half pounds.

Cereals—Dog crackers, cornbread, oatmeal porridge, cream of wheat, shredded wheat, rice (if well cooked), hominy. All of these can be used with plenty of milk. Amount—depending on size of the dog, a large soup plate full of cooked cereals with milk, one-half dozen crackers, etc.

Vegetables—Boiled onions, spinach, beets, turnips, beans.

Preparation of foods. Meat should be cooked with a liberal amount of water for broth. Vegetables, crackers, stale bread, are added in

the form of a stew. Season with salt.

Adult dogs confined to kennels where exercise is limited should be fed twice daily, the meat meal being given at night. If raw meat be used, it can be given alone. Otherwise cooked meat, vegetables, soup and crackers should be mixed together such as for the St. Bernard—2 lbs. cooked beef or lamb, 1 quart of beef or lamb broth; 1 selection of vegetables such as boiled onions (2 or 3); 2 or 3 dog crackers or 2 slices of stale bread.

Puppies of this class grow fast, and if one expects them to grow to be large, oversized dogs, rugged and strong of bone, they must be fed with care from three months to nine months of age. They are prone to rickets from worm infestation and malmedication. Cod liver oil is indicated to be given, two teaspoons between meals twice daily to three months old puppies; one tablespoon to five months old puppies; and one and one-half tablespoon to seven months old puppies. Johns Hopkins University is authority for the statement that cod liver oil is the best treatment for rachitis. It is also most effective to promote bone growth and acts as a tonic for the skin and coat.

Lack of the antirachitic vitamin. When dogs are fed on a diet lacking in fat-soluble vitamins, they will develop rickets and ophthalmic conditions. The puppy illustrated was fed on bred and milk. (From article by Emmett & Hoskins, July, 1923, issue.)

The St. Bernard puppy at three months should receive the following diet:

Morning:—1 teacupful of beef or lamb broth; 1 slice of stale bread or puppy cracker; 1 teacupful of thin oatmeal with milk.

Noon:—2 teacupsful of beef or lamb broth; ⅛ lb. cooked beef or lamb; 1 puppy cracker; 1 boiled onion or 1 tablespoon of spinach or turnip. Season with salt. Mix all together.

Night:—duplicate noon meal.

Another case of rickets from malnutrition.

Late night, 10 P. M.:—2 dry puppy crackers; 1 teacupful of broth.

The presence of nourishing liquids in the diet promotes body growth rapidly when combined with proper exercise.

The St. Bernard puppy at six months old should receive the following diet:

Morning:—2 teacupsful of beef or lamb broth; 2 slices of stale bread or 3 or 4 puppy crackers, or large soup plate of oatmeal and milk.

Noon:—2 to 3 teacupsful of beef or lamb broth; ¼ lb. cooked beef or lamb; 2 or 3 boiled onions; 2 or 3 puppy crackers. Season with salt. Mix all together.

Night:—duplicate noon meal. Late night meal omitted.

The St. Bernard puppy at nine months of age should receive the following diet, two meals a day:

Morning:—large soup plate of oatmeal, cream of wheat, hominy or cornmeal mush with milk, or 1½ pints of broth and 6 puppy crackers.

Night:—1½ lbs. of cooked beef or lamb; 1 quart of beef or lamb broth; 1 selection of vegetables; 6 dog crackers. Mix all together and season with salt.

Prohibited foods: boiled liver, veal, pork, corned meats, haslets, potatoes, rice unless well cooked, boiled eggs, raw fish.

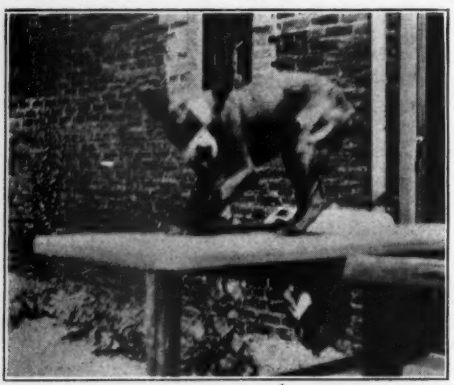
Class II

As we proceed with the second class of dogs next in size to the first, it will be perceived that the selection of foods is greater and possibly more expensive. The third, fourth and fifth classes will show even more in variety of foods.

For the following breeds, weight 40 to 75 lbs.: Collies, English, Gordon (black and tan), Irish and Llewellyn Setters, Dalmatians, Old English Sheep Dogs, Pointers, flat-coated and curly-coated Retrievers, Fox Hounds, Airedales, Welsh Terriers, English White Bull Terriers, Black French Poodles, Eskimo Huskies, Eskimo Spitz, English Bull Terriers, Doberman Pinschers, Clumber Spaniels, Harrier Hounds, Chesapeake Bay and Shepherds, German Boxer.

Meat:—beef, lamb, mutton, beef bone, boiled fish, raw beef. Amount:—one to one and a half pounds.

Cereals:—dog crackers, cornbread, oatmeal porridge, rice (if cooked until the kernels fall apart.) Amount:—2 or 3 crackers or their equivalent.



Dog affected with diabetes mellitus. Under diet treatment the animal did fairly well for six months, but was later destroyed. Case reported by Dr. F. R. Whipple in the October, 1923, issue.

Vegetables:—turnips, beets, spinach, asparagus, boiled onions.

Miscellaneous:—raw eggs, milk, malted milk, sour milk, buttermilk.

Preparation of foods—same as Class I.

Prohibited foods—same as Class I.

Class III

For the following breeds, weight 20 to 45 lbs.: Boston Terrier, French Bull, Beddington Terrier, Badger, Beagle, Mexican Hairless, Bassett Hound (over 20 lbs.), Welsh Springer, Cocker Spaniel, Field Spaniel, Sussex Spaniel, English Water Spaniel, English Springer, Portuguese Collie, Chow-Chow, Samoyedes:

Meat:—beef, lamb, mutton, beef hearts, beef bone, boiled fish, bone meal. Amount—½ lb. per day.

Cereals:—dog crackers, cornbread, cornmeal mush, stale bread, oatmeal porridge, rice (if cooked until kernels are broken up), crackers, zwiebach, Holland rusks, wheatsworth biscuits, cream of wheat, farina, wheatena, hominy, shredded wheat, corn flakes, prepared with milk. Amount—one or two crackers or their equivalent.

Vegetables:—turnips, beans, peas, spinach, asparagus, boiled onions, beets, baked apple.

Miscellaneous:—raw eggs, milk, malted milk, sour milk, buttermilk.

Preparation of foods:—same as Class I.

Prohibited foods:—same as Class I.

Class IV

For the following breeds, weight 10 to 20 lbs.: West Highland Terrier, Irish Terrier, Scottish Terrier, smooth-coated Fox Terrier, Wire Fox Terrier, Dandie Dinmont, Skye Terrier, Large Pomeranian (Spitz—over 10 lbs.), Samoyedes, Schipperke, French White Poodle (over 10 lbs.), Manchester (black and tan), Whippet, Clydesdale Terrier:

Meat:—beef, lamb, mutton, beef hearts, beef bone, boiled fish, bone meal, minced chicken. Amount:—one quarter pound or a little more.

Cereals:—dog cakes, milk bone crackers, puppy meal, stale bread, zwiebach, Holland rusk, biscuits, wheatsworth biscuit, cream of wheat, farina, oatmeal, shredded wheat, wheatena, corn flakes, cornmeal, cornbread prepared with milk. Amount:—one or two puppy crackers, or their equivalent.

Vegetables:—same as Class III.

Miscellaneous:—same as Class III.

Preparation of foods:—Less broth and other liquids are allowed as promotion of growth is not desirable. Sufficient soup should be used to moisten the mixture of cereal, vegetables and meat; otherwise, rules for the rearing of puppies are the same as Class I, except as to amount of food.

Prohibited foods:—same as Class I.

Class V

For the following breeds, weight 10 lbs. or less: Toy Pekingese (under 10 lbs.), Maltese Toy White Poodle (under 10 lbs.), Pomeranian, King Charles, Prince Charles, or Tri-Color, Japanese Spaniel, Brussels Griffon, Miniature Black and Tan (Manchester), Miniature Bull Terrier, Boston Toy Terrier, Toy Bull and Badger, Italian Greyhound, Chihuahua, Shetland Sheep Dog, Yorkshire Terrier, Blenheim Spaniel, Ruby Spaniel, Volpino, Ray Pinscher:

Meat:—beef, lamb, mutton, beef bone, boiled

fish, raw minced beef, bone meal, minced chicken. Amount—one-eighth pound or more.

Cereals:—puppy cakes, puppy meal, cornbread, cornmeal, corn flakes, hominy, oatmeal, shredded wheat, stale bread, toast, zwiebach, Holland rusk, wheatsworth biscuits, bran, cream of wheat, wheatena, farina prepared with milk. Amount—one puppy cracker or its equivalent.

Vegetables:—turnips, beans, spinach, asparagus, peas, boiled onions, beets, baked apple.

Miscellaneous:—raw egg, milk, sour milk, buttermilk, cream cheese, Griegere cheese, malted milk tablets.

Preparation of foods:—Exclude broths, giving only sufficient to moisten cereals, vegetables and meat. It is desirable to give meat alone often, also cereals mixed with meat. If liquids are largely excluded, one is able to retard the growth during puppyhood. Otherwise, rules for feeding puppies are the same as for Class 1, except for amounts.

Prohibited foods:—boiled liver, veal, pork, corned meats, haslets, potatoes, boiled eggs, raw fish, fruit, ice cream, cake, sweets, evaporated milk or condensed milk.

Food for Orphaned Puppies

From birth to two weeks: One part of lime water to three parts of Eagle condensed milk, gradually increasing from eyedropperful to one tablespoonful every three hours.

Two to four weeks: sterile water and cow's milk equal parts, warmed and sweetened. Two teaspoons to one tablespoon every four hours, or Elsay's food, Mellin's food, Ovaltine, etc., prepared according to directions for newborn infant.

Puppies four weeks to three months: bread and milk; bread and broth; patented puppy meal; beef juice, virol, Mellin's food, etc.

The Diet in Disease

The diet for acute respiratory diseases, including distemper, bronchitis, distemper pneumonia, distemper typhoid, bronchitis, pneumonia, should consist of nourishing liquid foods, such as broth, milk, white of egg and milk, barley water and broth, or milk, virol, ovaltine, etc.

All meat, vegetables or other solid foods should be excluded.

Nephritis, acute or chronic: exclude meat and use milk in all its forms, cereals, vegetables, broths.

Cardiac asthma and bronchial asthma: plain raw foods such as raw beef or milk.

Acidosis: exclude meat. Substitute milk and cereals.

Toxemia: exclude meat and broths. Dry cereals and milk allowed.

Gastritis, catarrhal: raw beef, fermillac, zoolak, junket, white of egg and milk, virol.

Surgical operation, especially laparotomy: liquid diet consisting of beef, lamb or chicken broth without fats for one week subsequent to operation. No milk. No solid foods.

EXIT ASCARIS

One of the privileges and responsibilities of the practicing veterinarian is the giving of advice to the public on how animal diseases may be effectively prevented. At this particular season information relative to methods of preventing loss from round worm infestation in swine is particularly timely for the swine breeder. In fact, sanitary conditions and methods employed during and following the farrowing period will influence in no small way the thrift and health of the herds during the summer months. Clean quarters free from round worm eggs will prevent loss from round worms. On infected premises methods of management must be employed to keep pigs away from sources of infection. Advise your breeders of the success of the McLean County system of swine hygiene. Take a few minutes to check up on the methods of your clients and point out to them the importance of simple preventive measures.—Animal Pathology Exchange, University of Illinois.

INCREASE OF POULTRY DISEASES

The frequency of live stock diseases is to a large extent dependent upon the density of the animal population. The poultry diseases of Nebraska furnish an excellent illustration of this. During the years immediately following the period of the pioneers, when farm flocks were yet small and far between, the diseases of domestic fowls did not constitute a problem worthy of great consideration. This has all been changed during the last ten years. Owing to the increased costs of food products and improved marketing facilities, the poultry industry has assumed proportions undreamt of a quarter of a century ago. Poultry raising gained recognition as a valuable part of the business of farming, and farm flocks greatly increased, not only in numbers but also in size. As the poultry population became more and more dense, disease problems commenced to present themselves at an incleasing rate until at the present time they must be reckoned with constantly and seriously.—Van Es and Martin.

Abstracts of Foreign Literature

By A. Eichhorn

The Diagnosis of Infectious Anemia of a Horse with the Aid of Rabbits

The authors established that by injecting horse blood containing the virus of infectious anemia into rabbits, it is possible to produce a blood picture which is identical with the one of horses affected with anemia. Furthermore, the disease may be transmitted to horses from rabbits infected in such a manner.

Inasmuch as blood smears obtained from animals infected with anemia frequently disclosed clumpings, the authors assume that the virus which adheres to the blood corpuscles is agglutinated through agglutinins of the serum in which phenomena they also attract the blood corpuscles. The agglutination of virus-serum plus blood corpuscles of horses does not take place in vitro. Likewise in mixing virus-rabbit serum with healthy erythrocytes and affected erythrocytes with healthy serum, agglutination does not take place. Serum of affected rabbits plus virus blood corpuscles of rabbits yield a hemagglutination.

The authors utilize for diagnostic purposes the serum of horses affected with anemia which produces an agglutination of the blood corpuscles of healthy and affected rabbits. Horses which are recovering have according to the authors such a small amount of virus in the serum that an agglutination takes place only with the blood corpuscles of affected rabbits. After recovery of the animals the agglutinins disappear rapidly from the blood.

Hogs, man and chickens show similar properties in their blood corpuscles. Guinea pigs, calves, sheep and dogs are immune. As a result of these investigations the authors maintain that it is possible to make a diagnosis of infectious anemia in vitro. Opermann and Lauterbach. (Berl. Tier. Woch., No. 46 and 47, 1923, p. 487.)

An Interesting Observation in anthrax infections (anthrax in hogs, ducks and cat)

During the emergency slaughter of a cow the stable and premises became smeared with blood. Two days later six hogs became affected with anthrax which received 15 cc of antianthrax serum. After another 48 hours all twelve hogs on the premises became affected. In spite of an intravenous and interperitoneal injection of 100-150 cc of antianthrax serum three hogs died. Several days later anthrax was established in a duck. The manifestations in the duck were edema of the head and of the anterior parts of the neck. The bronchial lymph glands were the size of a pea, very juicy and permeated with hemorrhages. The intestinal mucous membrane showed circumscribed inflammatory areas. All other organs including the spleen appeared normal. The diagnosis of anthrax was confirmed by histological examinations of the affected organs, bacteriologically and by the Ascoli test. The infection probably occurred per os through ingestion of the infected blood. Three days after the death of the duck, a five year old cat died. The face of the cat was markedly swollen, the bucal mucous membrane showed a hemorrhagic inflammation, the tonsils being especially affected. The lymph glands were swollen and hemorrhagic. The spleen and the other organs appeared normal. The bacilli were readily demonstrated. The infection in this case was probably also taken up per os.

Anthrax in poultry has been known to occur only following artificial infections. The author is of the opinion that poultry, dogs and cats on account of their methods of living are not frequently exposed to the infection of anthrax which explains the exceptional occurrence of the disease in these animals. Gerlach (Wiener Tier. Monatschr. 1923).

Hiccup (Singultus) in Horses

Clonic spasms of the diaphragm or hiccups is a rare occurrence in domestic animals. From the sparing reports in veterinary literature it appears that irritations from the digestive tract and over-stimulation of phrenic nerve are the etiological factors of this condition. Others believe that there is a direct connection between the contraction of the heart muscle and of the diaphragm. It is further attributed to be due to tumors which exert pressure on the phrenic nerve, feeding of moldy hay, oats and bread as well as ascarids in the intestinal canal.

The author had an opportunity to observe this condition in three ponies. In the first it lasted for three days and was found to be due to ascarides. In the second case the typical hiccup appeared in association with colic due to ascarides and impaction. In the third case the hiccup appeared very suddenly and occurred

synchronically with every second heart beat. This animal also was heavily infested with ascarides. In all of these cases the symptoms disappeared after the administration of tart. stibiat. and a laxative. These cases proved that hiccups may be produced by an irritation from the intestinal canal and these particular instances by the toxins of the ascarides. H. A. Zwijnenberg (Tied. voor Diergen, Vol. 50, No. 33).

Bovine Infectious Abortion*

By Dr. John M. Buck, Pathological Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

In a bibliography prepared by the Committee on Infectious Abortion of the American Veterinary Medical Association some five or six years ago, sixty-seven authors were listed who had made noteworthy contributions to the literature pertaining to this disease, which we designate infectious abortion. The publications contributed by these authors were presumably in most cases based upon original investigational work. A bibliography prepared at the present time would be somewhat more voluminous than the one to which I call attention. A sufficient number of investigators have grappled with the problem to remind us that its importance to the livestock industry has not escaped observation, and that those engaged in research work have by no means been inactive in striving to further knowledge regarding it.

The disease has been investigated from the standpoint of causation, transmission, diagnosis, treatment, immunization, etc. Investigations by different workers have been so numerous as to suggest that our knowledge of the fundamental facts at least should be well nigh complete, and yet so often have the views and conclusions of different writers differed or conflicted to such a degree on certain phases of the malady as to greatly perplex the reader of abortion literature.

It has sometimes been a cause for wonderment on my part as to how similar experiments by different workers could terminate in so varied a manner, but the longer I observe the affection the more evident it is to me that variations in results should naturally be anticipated. What we are inclined to picture as parallel or identical experiments may be quite the contrary so long as our knowledge remains as imperfect as at present regarding variations in virulence of different strains of the same microorganism, the effects that are produced upon them by artificial cultivation and the matter of susceptibility and resistance of different subjects to disease.

*Read before Maine Veterinary Medical Association, Portland, Me., Jan. 9, 1924.

The Bang Organism

The malady which I shall attempt to discuss is the one associated with the Bacterium abortus of Bang. The abortion committee of the American Veterinary Medical Association for 1921 recommended that the name bovine infectious abortion be restricted to the disease associated with this microorganism. This recommendation was adopted by the association. Its general adoption should accomplish much in the way of eliminating misunderstandings wherever and whenever the subject of abortion is being discussed. There is a disease associated with the Bang organism which is certainly wide-spread and of vast economic importance. There is an abundance of experimental evidence which supports this view. It is equally certain that cows may readily be rendered carriers of the Bang organism when the virus is introduced into their systems through certain channels, and that expulsion of the fetus is a common occurrence following experimental exposures. It has furthermore been demonstrated that the fetus, fetal membranes and fetal fluids usually contain and are often saturated with the specific infection when the fetus is expelled following both natural and artificial exposure. These facts alone in my estimation amply justify the committee's action in selecting a name to distinguish this malady from others that to appearances may be similar but unlike as to causation.

In this connection it may be stated that our knowledge at the present time is rather incomplete as to the abortofacient action of infections other than Bact. abortus. While it is true that the presence of several varieties of microorganisms have been demonstrated in aborted fetuses and their membranes, the significance of their presence continues to be more or less a matter of conjecture. Intravenous injections of cultures of vibrios Bacillus pyogenes, and different types of streptococci, all of which were isolated from aborted fetuses and used for inoculation purposes, before there was seemingly

an opportunity for much decrease in virulence have, in my experience, so far as could be determined, failed to invade or localize in the uteri of pregnant bovines although in one instance a suppurative arthritis developed from which Bacillus pyogenes was recovered at time of autopsy. The literature so far as I am aware, records the isolation of but a few vareties of microorganisms other than Bact. abortus from aborted fetuses and the encountering of these, too rarely to suggest that they may be highly important factors in causing abortion losses. On the other hand there is an abundance of available evidence to show that Bact. abortus Bang is a common etiological factor. Seldom have our efforts been other than successful in establishing its presence in herds where the number of aborted calves have been sufficient to cause the owner alarm, and little difficulty has been experienced in artificially infecting a considerable number of susceptible cows and heifers and in causing them to abort. The disease induced experimentally with the organism is apparently identical with the one resulting from natural infection.

In studying any communicable disease the investigator first of all tries to establish its cause and when this has been accomplished, proceeds to learn, if possible, through what channel or channels it invades its host, what organs or tissues are most frequently invaded, or suffer most from the invasion, and how it is eliminated. Knowledge regarding these factors is essential in the devising of effectual and economical control measures. These problems have been extensively investigated in connection with infectious abortion. The studies of them which have been made have strongly indicated that some of the theories regarding the disease that were quite generally accepted for years have no secure foundation and can reasonably be discarded. Numerous important facts bearing upon these problems of which we long had no knowledge have likewise been revealed.

(This is the first of a series of six articles on bovine infectious abortion by Dr. John M. Buck. The second article, on how and when the disease is acquired, will appear in the next issue.)

Observations on Farmer Vaccination of Swine*

By B. H. Brooks, D.V.M., Riverton, Iowa

This subject is not a new one, although during the last three years interest in it has been stimulated to some extent. When I began practicing in Iowa nearly ten years ago, I found farmers who had been to Ames, obtained a permit and were vaccinating their own hogs. Strange to say, not one of these farmers, so far as I can remember, now does any vaccinating at all. Indeed, they look with contempt and derision upon the move made the last few years to encourage farmer vaccination, and I consider them among the best clients I have. They are very free and outspoken about their experience with the filtrable virus, and some of their experiences are humorous to say the least.

I recall one of my best clients telling me that after attending the short course at Ames and obtaining his permit he came home, bought 300 head of pigs, vaccinated them himself and, to put it in his own words, "every damned pig died."

I can tell of another who started to vaccinate his herd and when he was about half through decided that the serum producer had named too large a dose on the label. So accordingly he cut the dosage of serum in half on the rest of the herd and as a result lost one-half of his herd with vaccination cholera. Both of these men profited by the lesson learned, and I consider them good clients.

But the cases I wish to call attention to at present are the graduates of the two-day school fostered by the farm bureau. In doing this, please remember that I have no ax to grind. I am not a calamity howler. I have no malice toward any person. I am simply stating the facts as nearly as I can. This also is not an easy thing to do, as farmers who do their own vaccination are loath to call their veterinarian when they have post-vaccination trouble, and the story nearly always has to be gotten from a neighbor who helped or was there a few days later when the trouble occurred.

The results of farmer vaccination in the community where I practice have been about fifty-fifty—fifty per cent good and fifty bad. Only about one permit holder in ten has used

*Presented at Iowa Veterinary Medical Association meeting, Jan. 15-16, 1924.

it in my locality. I might say that 90 per cent of the farmers, as long as their vaccination is done at a reasonable price with fair success, have no more thought of doing it themselves than they have of taking wings and flying. Nevertheless, they are as a rule more enlightened than they were a few years ago and are a little more exacting than they used to be; hence, the veterinarian who does their work must be clean and use the best of technic. Naturally, the better the results of the veterinarian's work, the better for him.

I am sorry to say that there are still veterinarians in the field who are trying to control hog cholera by giving mixed infection bacterins. The handling of hog cholera is no fool's job. The more I work at it, the more important and serious it appears, and the more study one can do on it, the better. Before graduating from college, I spent five months in a serum plant, and upon receiving my diploma from the veterinary school, I considered that what I did not know about hog cholera was not worth knowing. Before I had practiced two years, I came to the conclusion that I did not know anything about hog cholera at all.

The following are a few typical cases of trouble resulting from farmer vaccination, and as before stated such instances occur in about fifty per cent of the work done by laymen.

In July, 1922, a Mr. P of a nearby town vaccinated his herd of purebred Duroc hogs. Twenty-four hours later he called me over the telephone and asked my advice about hogs swelling so badly at the site of injection. From what I could learn over the telephone, several of the hogs had contracted septicemia from infection through the needle punctures. I heard no more from him at that time, but in a few days received a letter from Dr. H. Jensen of the Jen-Sal Laboratories, stating that they had received a letter from this man telling them of his troubles and asking their advice. They had simply referred him to me and one or two other veterinarians in that locality. This man had a stall rented at the fair at Shenandoah in August of that year but was unable to show his prize hogs there on account of the vaccination trouble.

In August 1922, Mr. R vaccinated his herd of purebred Chester Whites. I did not see them but was in that locality six weeks later, and one of his neighbors told me that the hogs were a pitiful sight to behold. Nearly all had developed abscesses at the point of injection and had been stunted so badly that the owner had given up the idea of taking them to the county fair.

In August 1923 a Mr. A invited two of his neighbors to come to his place and help him vaccinate his hogs. Supposing that he had employed a veterinarian to do it, they went and helped him. That night they came to my office and engaged me to come to their farms the next day to vaccinate their hogs, stating that this man had been so careless with the virus they were afraid to go about their own hog lots. They were very indignant over the affair and questioned me about this new law that would permit an untrained man to use hog cholera virus so carelessly. They stated he used no antiseptic at all but washed his hands and syringe in clear water and permitted some suckling pigs which he did not vaccinate to drink this water. In about five or six days, Mr. A came into my office and inquired of me how young pigs would take cholera, stating he had some little pigs at home that were showing symptoms.

So far as I can learn most of these men use no antiseptic at all to destroy the virus on their hands and instruments. Some few had purchased a bottle of tincture of iodin and put a teaspoonful of it in a wash basin of water, immersing their hands and syringes in the solution.

In many respects veterinary pathology, especially in that department of it dealing with contagious diseases, is far in advance of human pathology, and discoveries made in veterinary pathology, such as those by Pollender, Pasteur, Davaine, Koch and Metchnikoff, have had a far-reaching effect on the diseases of man. It was through the discoveries on animal diseases by Griffith Evans and Theobald Smith that tropical diseases have become unravelled. Pasteur revolutionized the knowledge of diseases of man and other animals by his discovery of the cause of fermentation, putrefaction and infection. There are not two medical sciences—only two applications of one medical science—one to man and the other to other animals. The medical man applies his knowledge of it to man and the veterinary surgeon to animals. The study of the diseases of the whole animal kingdom, and even of the vegetable kingdom, is included in medicine as a science.—The Veterinary Record.

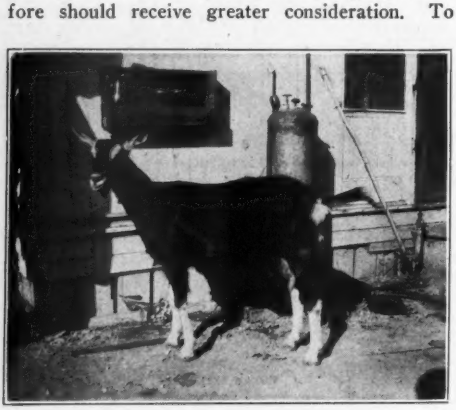
The Milk Goat

By J. F. Shigley

It is gratifying to note the interest in the milk goat as evidenced by the number of inquiries received since the first of this series of articles appeared in the January issue. These letters indicate the development of favorable sentiment toward this dairy animal; a sentiment that will find expression in the purchase of one or more goats.

Amount of Milk Produced

The most frequent query is, "How much milk will a goat produce?" The production record will depend on the breeding, care and management of the herd as it does with the dairy cow. Continued breeding of the milk producing strain will show in the daily production report, therefore should receive greater consideration. To



produce the greatest amount of milk, it is necessary to prevent the kid from sucking, and to milk the doe by hand. This is especially true of the first kidding. The foregoing factors are necessary and the records which follow warrant the effort required to have these factors operate.

The doe, El Chivars Geneva, produced 2158 pounds of milk testing 3.37 per cent butter fat in 312 days; Fanette No. 151, produced 2680 pounds of milk in twelve months. Her highest daily yield was 12 lbs., 10 oz. Both of these goats were Toggenburgs.

The Saanen doe, Swiss Echo, produced 2374 pounds of milk in a little less than eight months. This record was made at two years of age.

The highest record has been made by Blossom of Three Oaks No. 2916, owned by Mr. and Mrs. Schinker of Los Angeles, California.

A test made under tthe supervision of the University of California showed a production of 4005.4 pounds of milk in ten months and two days; a record which places this animal at the top of the list. Alba Suzette, a half sister of Blossom, produced 3248.5 pounds of milk in nine months by the same test. Isabelle No. 637, produced 3522.1 pounds of milk in ten months. These three goats are Saanens and are a part of the Three Oaks herd.

The New Mexico Experiment Station has been carrying on a trial with goats to determine what may be done in improving milk production of native does by breeding them to a pure-bred buck of a recognized milk breed. A Toggenburg buck has been used.

The progeny of the native does were bred to kid at one year of age. Three of these half-blood Toggenburg does have now milked for two lactation periods, and three more for one period. Two three-quarter blood Toggenburgs have milked for one lactation period.

The following table shows the average production in pounds of the animals considered. First lactation periods only are considered with both dams and daughters.

Milk Production During First 230 Days of First Lactation Periods

Average production of 6 half-blood yearlings	695.26 lbs.
Average production of their 6 dams	401.3 lbs.
Increase	293.96 lbs.
Average production of 2 three-quarter blood yearlings	756.8 lbs.
Average production of their half-blood dams	633.8 lbs.
Increase	93.0 lbs.
Average production of 2 three-quarter blood yearlings	756.8 lbs.
Average production of their native granddams	405.8 lbs.
Increase	351.0 lbs.

Value of Goat Milk as Food

The milk of the goat is of considerable value in infant and invalid feeding. Its fat content varies somewhat as is the case with cattle. The fat, however, exists in smaller globules and is more nearly a perfect emulsion than found in the milk of the cow. It is apparently of value in relieving constipation in infants who fail to respond to other changes in diet.

Goat milk is supplied to sanitariums, infant hospitals and to clinics conducted for relief of the diseases of children. Families in the east, especially, find the use of the milk of the goat not only a splendid diet for the infant and young children, but a matter of convenience as well. When going on the summer vacation, "nanny" is loaded into the trailer, or on the running board

of the car and a uniform diet for the small members of the party is assured.

Harvey W. Wiley, former Director of the Bureau of Foods at Washington, is quoted as follows: "I have long taken the ground that it would be an important contribution to the infant welfare in this country, if all infants fed other than their mother's milk could have goat's milk. I suppose the change will come slowly, but in my opinion, goat's milk has inherent qualities which will finally enable it to win out as an infant food in competition with the milk of the cow."

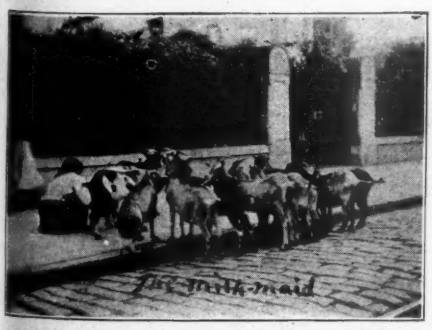
Forest rangers are finding the goat a convenient source of their milk supply during the time spent on duty at their out of the way stations.

The manufacture of cheese from the milk of the goat is a business which is rapidly growing. In certain sections of the country large numbers are kept for this purpose alone.

That smaller cities are able to secure a supply of goat milk is evidenced by the article which recently appeared in the Minneapolis Tribune. This account, in the form of a special feature, spoke very highly of the work done by Doctors Ejnar Lohrbauer and T. O. Brandenburg of Lakota, North Dakota, in developing a fine herd of milk goats. Their venture has proved a "life saver" to a number of infants suffering from conditions of a dietary nature.

Diseases of Goats

The raising of goats, however, is not all profit



Milch goats are kept around the larger cities in Brazil. They are driven about the city in bands and milked in front of the customer's door.

and losses may occur. Much has been written concerning the health of the goat; its freedom from disease, especially tuberculosis. While this condition is comparatively rare, tuberculosis is not unknown in goats and should be one of the factors given consideration in caring for the health of any herd.

A Champion Swiss Milk Goat owned by Dr. James Chamberlain, a veterinarian of Washington, D. C.

Goats are subject to external and internal parasites, Malta fever, takosis, pneumonia, abortion, mammitis, teat injuries, foot rot, plant poisoning, abscess, milk fever, and a number of other conditions associated with disturbances in the digestive process.

In the writer's experience the greater number of cases in the middle west are included under the heading of digestive disorders, abscess, parasites, and foot rot.

Indigestion, or colic as it is commonly called, usually requires prompt and efficient treatment. As with sheep, death may occur in a short time after the symptoms are noticeable. Such cases may be reduced to a minimum by following the methods advised with larger animals, namely, avoiding abrupt changes of food and maintaining a well balanced ration for the animal.

Abscesses are of very common occurrence. They usually are well defined and when drained, heal promptly. Usually the animal exhibits no marked physical effect during the development of the abscess or during the healing process.

The treatment of parasites and the care of the feet are important and follow the same lines as those employed in caring for the sheep.

In conclusion, one should bear in mind that the goat is increasing in numbers and value in this country. With this increase there is a

greater demand for the services of a veterinarian in guarding the health of the flock. The following references are appended as sources of additional information on this subject:

1. Types and Breeds of Farm Animals—Plumb.
2. The Milk Goat—Irmagarde, Richard.
3. The Milk Goat News—San Francisco, California.
4. The Goat World—Baldwin Park, California.

Developments in Veterinary Parasitology, During the Past Fifteen Years

By Maurice C. Hall, Associate Editor

(Continued from March issue)

Heteroxenous (several-host) Nematodes

The work of recent years has shown that there is a wide-spread inclination to wander through tissues on the part of monoxenous nematodes, as has been shown in foregoing articles. This disposition is even more pronounced in the heteroxenous nematodes. In the latter there is not only a universal disposition on the part of the larvae to wander through the tissues of the intermediate hosts, but also a disposition on the part of the adults, in many cases, to invade to a greater or less extent the tissues of the adult host. Consequently the monoxenous nematodes are customarily parasitic in the lumen of the digestive tract and exceptionally present in tissues, whereas the heteroxenous nematodes are customarily parasitic in the host tissues and occasionally present in the lumen of the digestive tract or in cavities.

Heteroxenous Nematodes of Equines

The Guinea worm (Dracunculus medinensis). The life history of the worm, commonly regarded as a parasite of man, but also reported from horses, cattle, dogs and various wild animals, was investigated by Fedtschenko about 1871, and of late years by Wenyon, Chatton, Leiper and Roubaud. The female worm lies in subcutaneous ulcers, sometimes on the trunk or upper limbs, but commonly on the lower limbs, and when these ulcers are brought in contact with water large numbers of larvae are expelled in a milky fluid. These larvae infect entomostracans of the genus Cyclops and develop to the stage infective for the primary host. When such infested Cyclops are swallowed in drinking water by suitable primary hosts, the larvae make their way to the submesenteric connective tissue, where they become adults and mate, the gravid female subsequently making its way to the subcutaneous tissue.

The spirurid stomach worms (Habronema spp.). The life history of a Habronema was first ascertained by Ransom in the United States, his paper incidentally reporting a common species, H. muscae, which had been previously overlooked. His work was closely followed by the work of Seurat and of Marotel abroad, and these investigations were extended by the work of Roubaud, Descazeaux, van Saceghem Bull, Hill, T. H. Johnston, Galli-Valerio and others. It has been found that the intermediate host of H. muscae and of H. megastoma is usually the common house fly, Musca domestica, though other flies may act as hosts; the host of H. microstoma is usually the stable fly, Stomoxys calcitrans, and rarely the house fly. The discovery of these life histories has led to the discovery of other important facts as the larvae of species of Habronema have been found to be the cause of summer sores, of a habronemic conjunctivitis, and of certain peribronchial nodules in equines.

Heteroxenous Nematodes of Cattle and Sheep

The gullet worm (Gongylonema scutatum). The life history of this worm has been investigated by Ransom and Hall in the United States and by Seurat in Algeria. According to the American workers, the intermediate hosts in nature are dung beetles of the genera Aphodius and Onthophagus and the larval worms also develop in the croton bug; according to Seurat the intermediate hosts are beetles belonging to the genus Blaps. The Americans developed the larvae in croton bugs as well as in dung beetles by feeding worm eggs and developed the adults in two sheep by feeding encysted larvae from dung beetles.

Heteroxenous Nematodes of Swine

The strongyline stomach worm (Arduenna strongylina). Seurat has shown that the intermediate hosts of this worm are beetles of the genera Onthophagus and Aphodius.

The six-winged stomach worm (Physoceph-

alus sexalatus). Seurat has found the intermediate hosts of this worm to be beetles of the genera Scarabaeus (Ateuchus), Gymnopleurus, Geotrupes (Geotrypes), and Onthophagus. He reports aberrant encysted larvae from various amphibians, reptiles, birds and mammals.

The American gullet worm of swine (Gongylonema ransomi). Ransom and Hall reported the feeding of the eggs of the gullet worm from American swine to croton bugs (Ectobia germanica) with the subsequent development of encysted larvae. The presumption is that the species involved is the worm recently described by Chapin as Gongylonema ransomi. Although croton bugs function as intermediate hosts of this worm and of G. scutatum, it is unlikely that they are the usual hosts. It is quite probable that dung beetles, perhaps the same species that serve as intermediate hosts of G. scutatum, serve as hosts of G. ransomi. Croton bugs, as Fibiger and Ditlevsen have shown, are also intermediate hosts, perhaps customary hosts, together with other cockroaches, of G. neoplasticum, a parasite of rats and mice which is of unusual interest to medical men in that infestations with this worm give rise to gastric carcinoma with metastases to other organs. The work of Fibiger and Ditlevsen constitutes one of the outstanding contributions to the subject of parasitology in recent years.

Heteroxenous Nematodes of Dogs and Cats

The obscure filarid (Acanthocheilonema reconditum). The intermediate stages of this worm were reported from fleas, lice and ticks by Grassi and Calandruccio, but various writers have expressed doubts as to the identity of the forms found by them and Noé believes that the larvae found by them in ticks is Acanthocheilonema grassii. Rao has recently reported the larvae of A. reconditum from mosquitoes (Culex fatigans) and has given a study of the life history.

Grassi's filarid (Acanthocheilonema grassii). Noé has investigated the life history of this worm and reports that it involves ticks, Rhipicephalus sanguineus, as intermediate hosts. As noted above, a similar life history has been reported by Italian workers for A. reconditum, but Noé thinks the Italians were working with A. grassii.

The cruel filarid (Dicrofilaria immitis). The fact that this worm has its intermediate stages in mosquitoes was ascertained by Noé over 20 years ago. Recent investigations in detail are by Fuelleborn and by Saisawa. Breinl has shown that the larvae may develop in fleas. It may be noted in this connection that the recent report of D. immitis from the cat for the first time by Riley seems to complete the case as regards the identity of the microfilaria reported from the blood of the cat by Chatton in 1918. Chatton's microfilariae were morphologically indistinguishable from those of D. immitis, but the cat had never been reported as a host of this worm. Riley's record indicates that the cat is an occasional host, thereby removing this objection to the idea that Chatton's microfilariae belonged to this species.

The creeping filarid (Dicrofilaria repens). The life history of this worm, as ascertained by Bernard and Bauche and by Dutton, involves intermediate stages in mosquitoes.

The gastric spirurid of cats (Spirura gastrophila). Seurat has ascertained that the larvae of this worm develop in beetles of the genera Blaps and Onthophagus and in the cockroach as intermediate hosts. The worms occur as fourth stage larvae, probably aberrant, in some reptile and mammalian hosts.

The sanguinolent spirurid (Spirocerca sanguinolenta). Grassi reported the cockroach as the intermediate host of this worm, but Seurat regards this as erroneous and finds the intermediate hosts to be beetles of various genera. Seurat also finds the aberrant larvae in a wide range of hosts, amphibians, reptiles, birds and mammals.

The giant kidney worm (Dioctophyme renale). Ciurea has found a larval nematode, which he regards as the larva of the kidney worm, in a fish.

Heteroxenous Nematodes of Birds

Theiler's spirurid (Filaria gallinarum). Theiler has found the larval stages of this worm, which is a parasite of the jejunum of chickens, in one of the termites or white ants, Hodotermes pretoriensis, the termites feeding on droppings containing the eggs and the chickens eating the ants. The worm does not belong to the genus Filaria, but Dr. Theiler tells me that it will be assigned to its proper genus in a forth-coming paper by Dr. Moennig.

The spiny tetramere (Tetrameres fissispina). A larva described by von Linstow from the water flea, Gammarus pulex, is regarded by Seurat as the larva of this worm.

Acanthocephala

The American dog echinorhynch (Oncicola canis). Van Cleave has found the larvae of this thorny-headed worm in the armadillo, Dasypus novemcinctus texanus. Whether the armadillo is the customary secondary host remains to be determined.

The small echinorhynch of water-fowl (Polymorphus minutus). Ritche has reported the water flea as the intermediate host of this worm. The worm has recently been reported from Canada by Wickware.

(To be continued)

Items of Interest to the Practitioner

By A. T. Kinsley

Soy bean hay or straw is highly recommended as roughage for horses and mules.

Fresh meat and milk contain the essential pellagra-preventive factor or factors.—Public Health Report.

An ordinary cow eliminates 10½ pounds of water in twenty-four hours and this is one of the reasons for ventilation.

Trichinosis in the human has been reported from three different locations in New York state. Nineteen individual cases, three of which were fatal, occurred in the three outbreaks.

A non-motile coccobacillus has been isolated from lesions and the blood of animals that have succumbed to an acute type of bovine pleuropneumonia in East Africa.

The cheese production in the United States for 1922 was 369,980,000 pounds, of which over two hundred million pounds were produced in the state of Wisconsin.

The principal causes of losses in recently hatched chicks are improper incubation and brooding, deficient diet, bacterial infections and parasitic infestation.

It has been demonstrated that sufficient vitamins are obtained in a diet of properly selected foods without the use of specially prepared vitamin foods or drugs.

The history and development of the Brahman cattle in the United States are given in detail in Farmers' Bulletin No. 1361 of the United States Department of Agriculture. There are many interesting facts relative to the Brahman cattle in this bulletin that every veterinarian should know.

In tuberculosis control work, durability of public confidence and support will depend ultimately on actual cost and actual results, not on apparent results or on propaganda.—Reynolds.

During 1923 there were 55,329,843 hogs received at public stock yards in the United States. This number exceeded the receipts for 1922 by 11,262,354 head and the average receipts for five years by 27.7%.

The longevity of mosquitoes (anopheles) in the summer time varies according to the amount of food they obtain and perhaps some other factors may have a bearing on the duration of their life; however, under ordinary conditions they live from 20 to 30 days.

It has been estimated that 85% of the corn produced in the United States is consumed by live stock of which approximately 40% is fed to swine; 20% to horses, and 15% to cattle. Feeders have learned that continuing a strictly corn diet even for fattening animals, is inviting trouble.

Growth and development in animals are dependent upon a diet containing vitamins and correctly balanced chemically. Vitamins are widespread and sufficient quantities of them occur in a variety of foodstuff to supply the nutritional demands without the use of artificially prepared vitamin foods.

Tuberculous cavities in the lungs of the human have been drained and sterilized. The operation is done under local anesthesia and the channel from the surface into the cavity is made by a thermo-cautery thus diminishing the possibility of hemorrhage and prohibiting generalization of infection.

It has been demonstrated that the daily exposure to the influence of radium reduces both red and white blood cells and diminishes blood pressure and thus seriously interferes with human health. These changes are thought to

be due to the action of the radium on bone marrow.

The loss from improper methods of handling and storage of eggs is enormous. According to Phillips, the Indiana producer loses one and one-half million dollars annually because the eggs are not satisfactory to the consumer. These losses can be reduced to a minimum by swatting the rooster, and the storage of eggs in cool dry places.

Two types of botulinus infection has been established as important in food poisoning in different animals and now a third type has been identified. Recent reports indicate that type C. bacillus botulinus or Clostridium botulinum is the etiologic factor in leg weakness in fowls.

An outbreak of bovine influenza (hemorrhagic septicemia) has been reported by Futamura of the Laboratory of Agriculture and Commerce of Tokyo. The outbreak occurred in a herd of 23 cows and 22 calves. Thirteen of the calves succumbed prior to immunization.

Tularemia has been identified in rabbits from Tennessee, Kentucky and Kansas. This disease is of importance primarily because it affects the human. The infection is transmissible from infected animals to the human. Three such cases have been reported by Francis in Cincinnati, one in Charlotte, N. C., and one in Washington, D. C.

The beef cattle producers in Argentine experienced severe reaction after the close of the war. During September and October, 1923, the highest price for the year, $4.20 per hundred pounds, was realized by the producer. The Argentine congress passed a law in the fall of 1923, fixing a minimum of $5.10 per hundred, but packers refused to buy and the law was suspended.

The farm value of the chicken industry in the United States in 1923 was over one billion dollars and this sum was about 17% of the value of all animal products. There were approximately 475,000,000 chickens on farms January 1st, 1924, an increase of fifty million since January 1st, 1923.

Welch and Goodlive recently observed a German police dog that persisted in biting its tail until the circulation was so impaired that sloughing occurred, leaving only a short stump. The pruritis and irritation of the skin of the tail occurred promptly following the injection of 5 mils of canine distemper serum.

Tuberculosis is a disease that concerns the sanitarian under all climatic conditions. Like many other diseases, its spread is facilitated by housing and therefore tuberculosis control in the northern states and Canada, requires more viligance than in the southern states. Bulletin No. 5, from the Alaskan Experiment Station describes tuberculosis from the station herd on the Kodiak Island. A detailed description is also given on the management of a Bang herd.

Nasal polypi and other defects of the nose and throat are frequently associated with asthma in the human and some cases have been relieved by correcting defects in the upper air passages. There is no apparent relation between nasal and throat disorders and asthma but there is certainly a reflex in some cases. Is it possible that some cases of emphysema (heaves) in horses may be due to reflexes induced by disorders of the upper air passages?

It is probable from the available facts in the history of medicine that cancer is a modern disease. No evidence of cancer has been found in ancient medical history neither has there been any indication of cancer in the study of mummies. It has been suggested that interracial marriages may have caused some disturbance in cell development in the cross breeds that has resulted in cancer formation. Cancer mortality is increasing at an alarming rate in some localities and thus far the cause has not been determined. Strong, in the "Journal of Cancer Research" states that it is not possible to state whether cancer mortality in the United States is increasing or decreasing but that it is not greatly increasing.

A case of Malta fever in the human has been reported, from which an organism belonging to the Abortus group, apparently of bovine origin, was isolated. This is the first case of Malta fever reported in which the causative organism was a representative of the Brucella group. If the bacillus of bovine abortion is pathogenic for man the control measures of that disease in cattle will assume a different aspect.

TREATMENT FOR PURPURA HEMORRHAGICA

What is the best treatment for purpura hemorrhagica?—J. S. J.

Reply by Dr. A. Eichhorn: Primarily the proper hygiene should be employed in such affections. The animals should be given plenty of fresh air and an abundance of good drinking water. It is also advisable to add to each pail of drinking water, one dram of hydrochloric acid.

The swellings and sloughings, if such occur, must be treated according to surgical means with proper antiseptic treatment. In case of swelling of the nasal mucous membrane, the nasal cavity should be syringed with a 3% to 4% boracic acid solution. The wounds resulting from the sloughings should be washed with an antiseptic solution and then dusted with some antiseptic dusting powder. In case there is danger of suffocation from the swelling of the throat, tracheotomy must be performed.

Very good results have been obtained from the injection of collargol, of which 50 c.c. of a one per cent solution is injected intravenously. This should be repeated at first twice daily until indications of improvement are noticed.

Large doses of antistreptococcic serum are now generally used in the treatment of purpura hemorrhagica. It is best to give not less than 100 c.c. as an initial dose, which should be repeated two or three times in 24 to 36 hour intervals.

From the foregoing, it will be seen that there is no specific treatment for this condition, but the outline given will yield the best results in the majority of cases.

SPAYING HEIFERS

As I live in a blue grass section and have spayed over three thousand heifers in the past six years, I thought possibly my experience might be of some help in answering some of the questions on this subject by A. T. K. in the March issue of VETERINARY MEDICINE.

I think the flank method would be the safest and most practical operation as heifers at any age from six months up can be handled in this way. My experience has been that 95 per cent of pregnant heifers will abort after the operation. Metritis following abortion has occurred in about 2 per cent of cases under my observation.

I do not think it would be well to ship the same day spaying is done. I believe it would be much safer to spay the heifers after they have arrived at the country feed lots. If the lots are muddy and dirty, one may expect a good deal of trouble from infected wounds. Clean surroundings after spaying are essential to a successful outcome of the operation.

V. R. Homan, D. V. M.

Sugar Grove, W. Va.

LOWERED MILK PRODUCTION OF COW

A purebred Holstein cow, seven years old, dropped a well developed calf, about two months ago. No congestion of the udder was noted either before or after parturition. After the calf had taken all it wanted, about twenty pounds of milk was drawn from the cow, but she was not milked dry, each quarter apparently giving the same amount. At the next milking, only one-half of the udder was filled with milk; we thought the calf had taken all from the other half.

The calf was then taken away from the cow and the cow put on a full feed. At the next milking, the right half of the udder produced only about three ounces and the left half about twenty pounds. The same was true of the next milking.

On close examination of the udder and teats and general condition of the cow, nothing abnormal was noted. Last year this cow produced about sevently pounds of milk a day. She was dried off and given a rest of about six weeks. She never had any trouble with the udder or teats.

I gave one-half grain pilocarpin subcutaneously three times a day the first day, then thirty c.c sterile milk (colostrum) every other day for a week and followed that with a galactagogue powder.

The cow now milks one pound from the right half and thirty-seven or eight from the left half of the udder. Is there a possibility of her producing as much as normal next year?—J. A. E.

Reply by Dr. DeVine

As to the cow, your guess should be just as good as the other fellow's. Physiologists have attempted to question such conditions, but I question if anyone could give positive information on this phenomenon, which is seen quite frequently in dairy cows.

This I do know from experience in my own dairy, that if large producing cows are not prepared with greatest care—that is, with particular reference to feeding and conditioning—before freshening, udder troubles are almost

sure to follow. But it is very probable that you and your client know this.

As to treatment, you did just what we would expect any well informed veterinarian to do. Whether the udder will be normal at the next freshening or not, no one can answer with positiveness. However, in practice, we find that if the affected part of the udder dries up, leaving the gland tissue apparently normal—that is, with no indurations—such parts usually function normally or nearly so at the next lactation period.

It is our custom to have the affected quarters milked and massaged regularly, giving special attention to such quarters, at each milking time and at the same time rubbing a mixture of equal parts of alcohol and olive oil well into the udder.

STERILITY IN COWS

I was recently called to see two purebred Durham cows, one six years old and has had three calves, the other three years old and has not yet been in calf. Upon examination, I found the cows to be perfectly normal. They have been bred every three weeks the past summer but failed to get in calf. Do you know anything of the yeast treatment and how it is used or of any other treatment that would be beneficial in this case?—T.M.M.

Reply by Dr. DeVine

You probably realize from your knowledge of veterinary medicine that it would be practically impossible to give any real information as to the cause of these animals not breeding, since you state they seem to be normal.

If you reported some abnormalities of the ovaries, fallopian tubes, uterus or cervix, we would naturally associate such abnormalities with the cause. The history in some cases would help us. For instance, the older cow that has had three calves—what has been her history? Has she calved normally each time and passed the placenta promptly, or has she aborted or held the placenta? Have you had enough experience in this work to feel certain that you can eliminate tubular trouble?

I frequently find that men who are not in a position to do a lot of this work sometimes overlook an enlarged fallopian tube (indicating infection) on the side of the good ovary; that is, the ovary that is functioning and the other ovary not functioning. Some may remember that we had a case just like this in the Jersey cow at the Clinic of the A. V. M. A. held at St. Louis. It is also well to remember that cows do not conceive nearly so promptly or regularly from the left ovary as they do from the right.

I personally do not believe that the yeast treatment would be of any advantage in these cases. If there is any discharge at all, douching with an alkaline astringent will be indicated.

POISONING FROM CATTLE FEED SUSPECTED

Cows were fed three handsful of ground feed four or five times, and five animals became sick, one down; temperature subnormal, 98° F.; mucous membranes pale; no peristalsis; and towards the end a continuous salivation of ropy saliva from the mouth; extremities cold. There was twitching of the muscles. Animals lived two to four days. One is still alive. This one has been drenched with milk and eggs several times daily, but a watery diarrhea persists. These cattle have been treated with everything available without favorable results. They were all given a large dose of Epsom salts at once and put on KmN04 and sulphocarbolates with intramuscular injections of camphorated oil, also nux. No doubt, there was a poison in the feed, but what I do not know. Has anyone else had similar experience with feed? Several others have been sick from this, but previous cases have not proved fatal. All other feed on the farm is absolutely clean and of good quality. This is a prepared dairy feed consisting of cottonseed meal ground, bolted screenings from wheat, molasses, flax plant byproducts, middlings, oat shorts and oat hulls, wheat bran, mill run screenings and salt. The composition is given as protein 16½%, fat 3½%, fiber 14%, carbohydrates 63%.—O. O.

Reply by Dr. J. F. DeVine: It would be rather a serious thing to accuse a dairy feed of poisoning cattle unless the proof is decidedly positive. However, the symptoms described surely suggest protein poisoning or gastroenteritis as we see it in cattle, particularly animals being pushed in advanced registry tests. The least added amount of cottonseed meal or oilmeal will often precipitate serious disturbances, with the symptoms very much as cited in this case.

A chemical analysis may or may not give any definite information. A better way would be to feed some healthy cattle on this feed only, in about the same amount that was fed in this case and observe the results. It would be well to keep in mind the vagaries of hemorrhagic septicemia. A bacteriological examination in such cases might give information.

SPAYING COWS AND HEIFERS

The extreme difference in prices of the stuff compared to steers during the past three years has caused a renewal of spaying, an operation that had fallen into disuse during the cattle boom days.

Spaying is the one sure way of limiting production and this seems the only remedy for prevailing low prices. Spay a heifer and she can be grown to maturity while ranging with mixed cattle or may be fed out at any age. A barren heifer is always the fattest animal in the herd.

Cows and heifers may be spayed at any time when not pregnant if the weather is favorable, and at any age from two months to fifteen years. Calves are usually spayed at from two months up, while suckling or in the fall after weaning time. Heifers are best operated on at one year old, but may be spayed later if not bred. Stock cows intended for fattening may be spayed when their calves are one month old or more, and turned into feed lot when calves are weaned. Milk cows are spayed to increase and continue milk flow and are handled six weeks after calving.

Spring, early summer and fall are the most favorable seasons. Flies can be guarded against and heat and cold have little effect, although extremes should be avoided.

The average loss when operation is performed by an experienced man under favorable conditions is less than one per cent.—Dr. L. Fredenburg, Council Grove, Kans., in The Kansas Stockman.

MILK FEVER AND WHAT ELSE?

About the middle of December, I was called three miles in the country to see a grade Jersey cow that was down and unable to get up; in fact, would not attempt to rise. She had given what secured to be normal birth to a calf the night before, was in good flesh and a heavy milker. It looked to me like a typical case of parturient paresis. The animal was in a comatose condition with a temperature of 96.5° F.

I pumped air in until each quarter was tensely distended and injected atropin sulphate, one-half grain. The cow was then propped up on her breast, and in about an hour I injected one-half grain of strychnin and covered the animal well with blankets. She was in a warm barn. I left about 4 P. M. The cow gained a standing position about 7 P. M. and was up part of the time during the night.

The following morning, the animal was unable to rise, but the owner did not report to me until the afternoon. I returned to the farm. The cow's temperature at this time was 96.5 degrees. I inflated the udder, injected atropin and applied hot sacks of salt and sand. The animal was then in almost a comatose condition.

The owner called me the next morning, informing me that the cow failed to revive any with the last treatment. We were ready for a funeral but had to wait. The owner was a good nurse, turning the animal over two or three times a day, propping her up part of the time and keeping her well covered with blankets.

On the eighth day I was called to see the patient again. At this time she had a normal temperature. I inflated the udder again, injected strychnin and instructed the owner how to inject one-fourth grain doses of strychnin every five hours for about twenty-four hours.

The cow drank water several times. The bowels acted some about every day after the third day. However, the animal would not eat anything nor make any attempt to rise, and would not notice the calf. When propped up she would not hold her head up but laid it around to her side.

The cow died on the fourteenth day without having regained consciousness, except on the last day she showed some signs of noticing the calf.

If this was not a case of milk fever, why did she show improvement with the first treatment? If it was milk fever, why did she live so long in a comatose condition and failed to show any improvement with the second and third treatment?—J.C.W.

Comment by Dr. DeVine

I think every country practitioner who has had a good bit to do with cattle practice has seen cases at least analogous to the case you describe. You certainly describe what might be styled a typical case of milk fever, and your treatment was surely along modern lines. It is simply one of those cases where complications of some sort intervened before recovery was complete.

From your description, I personally would eliminate two or three of the ordinary conditions that are sometimes associated with or mistaken for milk fever. I would eliminate atony of the rumen. I would also eliminate postpartum paralysis, due to the fact that the animal got up and went down again, because

I have seen postpartum paralysis set in on the second or third day rather than immediately after calving, but rather on account of the comatose or semi-comatose condition, which would in my judgment also eliminate the paralysis we see occasionally in cases associated with intestinal pressure.

After these eliminations, the next thing we would be apt to think of would be cerebral hemorrhage involving a small blood vessel.

You know, we all get our prejudices. I have had occasion to treat many cases of milk fever during my life. I feel sure I have treated somewhere between five hundred and a thousand, and for the past fifteen years I have not used a hypodermic syringe on one of them.

I am as certain as I can be of anything that during the period previous to that, when I was using atropin, strychnin and other things that had been recommended, that I helped to kill some of them after air inflation had done its best to save them. During the past eleven years, we have not to my knowledge had a single case of collapse in our practice, and our treatment has been simply through inflation, proper care of the animal and digitalis, strophantus and nux vomica per os.

THE STOMACH TUBE IN COLIC TREATMENT

I have been using a single tube stomach pump and have had difficulty in pumping out the water which I have pumped into the horse's stomach. How much water is it safe to pump into a horse's stomach before commencing to pump it out?—T.M.M.

Reply by Dr. DeVine

Naturally, when we use the stomach pump and tube, we have in mind emptying the stomach, so we pump in water enough to liquefy the contents so it will flow out readily. In our practice we strongly advocate the stomach tube and use it on every case of colic, excepting where the trouble is plainly a spasmodic condition or of little consequence.

It is our custom after passing the tube to pump into the stomach about half an ordinary pailful of warm water. We then remove the tube from the pump rather quickly and if the flow is not satisfactory, we pump in some more water. It is not an unusual thing in emptying the stomach to pump in 18 or 20 quarts of water before we get a satisfactory return, and in some cases of acute indigestion, we frequently use eight or ten pails of water before it returns from the stomach clear.

We then put some of our colic powder into part of a pail of warm water and pump it into the stomach and leave it there. I think it is common knowledge that a recently engorged and dilated stomach should not be left entirely empty.

FISTULA AND POLL-EVIL CURE

I have read in the journal on different occasions of formulae of certain proprietary medicines. I should like to know the formula for Fleming's Fistula Cure.—A.V.J.

Reply: The following preparation is reported to be practically the same as the much-advertised proprietary.

For lump jaw the olive oil may be omitted. Use as a liquid blister at intervals of ten days:

℞

Tr. cantharidis	ʒ ii
Tr. iodi	ʒ iii
Ol terebinth	ʒ iv
Ol. succini	
Ol. tiglii	aa ʒ i
Hydrarg. chl. cor.	ʒ iii
Ol. olivae	ʒ viii

M.

Sig. Inject into sinuses at intervals of seven to ten days.

The formula of any given proprietary remedy is a bit uncertain and frequently a changing quality. These formulae change from time to time according to the fluctuation in the price of crude drugs or the whims of the manufacturer. They are under no obligation to keep their formula the same.

DENTAL FISTULA IN A HORSE

A horse was brought to my barn with a lump on the side of the face, and discharging pus from the left nostril. I found the third molar split and decayed and food passing through the split tooth into the cavity of the head. I trephined the head getting out a large quantity of very foul smelling hay, even pieces of corn cob and other matter. I extracted the tooth, washed thoroughly and have kept up the irrigations every day since, but the opening from the mouth into the sinus remains. What can be done for it.—C. C.

Reply by Dr. E. L. Quitman: I would recommend freshening the edges of the sinus by means of a currette, and then if there still remains the odor of necrosed bone, swab it once or twice daily for five or six days or longer, if necessary, with diluted hydrochloric acid

(10%). It may be necessary to trephine into the connecting sinus in order to currette it properly.

Internally, the administration of precipitated calcium phosphate in tablespoonful doses mixed with the patient's food three times daily, will materially aid in the repair of the bone.

PASSIVE PULMONARY CONGESTION (SUB-ACUTE)

To me this was a rare experience, being the only cases of the kind I ever saw. An added feature is the successful results in one case following administration of a preparation intended for human use.

Case No. 1

A brown gelding. Four days previous to my seeing him, he had difficult breathing that daily became worse and at last rendered him unable to work. He presented an extremely labored respiration, resembling that seen in cases of hydrothorax. The temperature was 101° F. and went no higher during the entire course of the sickness. The appetite was very good. There was an occasional cough. Auscultation revealed decreased respiratory murmurs over entire both lungs. There was no evidence of extreme dullness as seen in pneumonia and no evidence of liquid in the chest. Pulse 40 per minute with a feeling of an overload.

Treatment: Extracted three quarts of a very dark blood from the jugular, which was due to a sluggish pulmonary circulation, decreasing oxygenation. Gave strychnin and digitalis. The next day showed some improvement. I continued the same stimulating treatment. The heart load was perceptibly lightened. On the fourth day the breathing became labored to the same degree as before. The bleeding was renewed and the same stimulants continued, with an aloetic pill. This case see-sawed back and forth for three weeks, when despairing of a complete recovery, the destruction of the horse was ordered.

Postmortem examination: On removing the ribs, the lung popped out of the chest cavity like a jack-in-the-box, the lung resembling liver and of the same density. There was no evidence of pneumonia or pleurisy. Heart normal; aorta normal; abdominal organs healthy. The size of the lungs was easily double the normal, which accounted for the distressed breathing, being chest-bound.

Case No. 2

In the same stable two months later was a bay gelding with symptoms identical to case No. 1. I did not use any of the treatment given in the first case but gave five mils of anti-pneumococcus serum combined (Abbott). While the symptoms shown did not call for the administration of the serum mentioned, the results were remarkable. Ten hours after giving the serum, the breathing became normal, and there was no evidence of any illness whatsoever. The temperature went from 102° F. to normal. The following day the patient received fifteen minutes exercise, and this was increased daily. About seven days later the symptoms returned and five mils of the serum were again given. A few days later the horse was put to work, and there was no return of the trouble.

The action of the serum was direct and acted promptly on this case at its initial dose and also when the case relapsed, which throws out any thought of a possible recovery without its use. It acted as a specific and did for this case what the other treatment failed to do in the first case, which was identical although a little more severe than the second. Without the use of the serum there would in all likelihood have been another death. The congestion was purely functional. Bleeding which one would have expected to cut short the condition, produced but temporary results. How did the serum act and why?

George L. Warner, D. V. S.
New York, N. Y.

NECROTIC STOMATITIS IN SUCKLING PIGS

These cases were investigated on a farm near Aylmer, Ontario. Four litters of young pigs had developed sores on the gums, cheeks, tongue and snout. The affected ones rapidly emaciated and died. The pigs were about two weeks old when infection occurred. All of the pigs in the four litters became affected and died. The sows were bred again and gave birth to average sized litters of healthy pigs. These second litters when about two weeks old began to develop sores on their mouths and die off as their predecessors.

The sick pigs all showed ulcers in some part of the mouth, lips or nose. The lesions had a characteristic necrotic center and a bad odor. Nursing was painful to them so the pigs did not suck and rapidly became emaciated due to a lack of nourishment. The infection had spread rapidly as the infected and healthy pigs were all mingling together and nursing the same sow.

As the pigs were being kept and reared under filthy conditions, the owner was instructed to

exclude them from the filthy barnyard to which they had free access, and to cleanse and disinfect the pig pens. The affected pigs were also removed and placed by themselves. For treatment the necrotic tissue requires to be removed and the affected parts of the mouth cleansed with peroxid of hydrogen and painted with tincture of iodin. These cases usually develop in young pigs kept under filthy conditions and may be prevented by keeping them in clean pens and dry yards.—Report of Ontario Veterinary College, 1923.

PREVENTING HOG CHOLERA BREAKS

Having read a number of articles in the journal the last few years in regard to breaks following vaccination against hog cholera, stimulated me to write these few remarks concerning my experience in using anti-hog-cholera serum and virus in this community, where I have practiced during the last twelve years.

This vicinity does not have large herds, the majority of the farmers raising from 20 to 300 head of hogs yearly, and most of them are vaccinating nowadays.

I believe these breaks can be practically eliminated. At least 98 per cent of them have been eliminated in my work by using the following procedure:

First, the client is advised to have his hogs vaccinated when they weigh 30 to 40 pounds. The same results can be obtained in larger animals but at greater cost and labor. I absolutely refuse to vaccinate and castrate at the same time. If the animals are castrated, they should not be vaccinated until at least ten days afterwards; or if vaccination is done, castration should be deferred for ten days. I insist on the vaccination of all unvaccinated hogs on the farm. If this is not done, the vaccinated animals should be kept in a separate place where they will not come in contact with the unvaccinated ones for at least three weeks.

Second, I encourage worming of the animals and sanitation, especially of the sleeping quarters.

Third, and this step is very important—buy your serum from a plant known for its exceptional sanitary and efficient production facilities, even though it costs a few cents more than others, and stay with that company once you get good results. If you become known for using a certain brand of serum, soon your client's neighbors will ask their veterinarian to use certain serum.

Fourth, use from five to ten c.c. more serum than the minimum dose with the full maximum dose of fresh virus (I get the virus fresh at least every thirty days).

Fifth—this procedure is very essential in preventing breaks, lameness and abscess formation. Place the serum and virus in warm water for at least ten to twenty minutes before using it or while arranging table or box with a clean towel and adjusting syringes, etc. Some more warm water may be added from time to time to keep the serum at about body temperature. Have plenty of warm antiseptic water to start with and some clean gauze to wash the axillary space before injecting. After injecting use a cotton swab saturated with straight iodin. There will be just enough moisture in the axillary space to help the iodin, as I believe on a moist surface iodin does better than on dry tissue, and it takes less.

Sixth, advise reduction of feed to half with practically no corn for five days, with plenty of good water and a fair range where practical.

In concluding these remarks, I wish to say that this procedure may take a trifle longer and may cost the client in small herds ten to fifteen cents more than with the methods commonly employed, yet my results have been better than where I just injected the serum and virus as a number do to make speed and a cheap price.

My explanation for warming the serum is that I believe in injecting cold or chilled serum it is not absorbed so readily, while sometimes in fat animals the virus is not absorbed at all, and there is not obtained the reaction that ensues if the serum and virus are of blood temperature or thereabouts. Then, too, large doses of cold serum in the tissues act as a mechanical irritant and encourage local infection and lameness. These are some of my own reasons. I have not given them any great study, other than taking note of the results I have obtained following the use of this method.

During the last seven years, I have used only two different companies' serums. I confess I could have purchased cheaper serum at times, but I feared the results and thus stuck to that with which I got good results.

I have had some unusually good results with the following method in infected herds: Increase the dose of serum 50 per cent with the usual dose of virus; change quarters and give internally preparations with a large amount of charcoal (carbo ligni) and separate the high temperature from the low temperature hogs, using the precautions previously mentioned.

Jno. W. Brown, D. V. M.
Ft. Scott, Kansas

OESTRUS OVIS IN SHEEP

In my territory here in Iowa, we are having some trouble with Oestrus ovis in the larval stage. In one instance there was a loss of nine out of ten head of sheep bought from a flock four miles distant; there was no loss in the original flock. This was striking. Could it be that there was a slight infestation in the whole flock and that the ten head were improperly fed and housed which was responsible for the loss?

I have under observation another band of sheep. Originally there were 240 head; 200 were Wyoming sheep and the balance were natives. Twenty head have been lost. A postmorten examination of one of them showed a very extensive affection with nodular disease. However, this sheep's head contained the larva of the Oestrus ovis, and several more heads exhibited the same larvae.

I am wondering if a contribution on the Oestrus ovis by some authority on sheep diseases would be seasonable. For one I should greatly appreciate it. Among the questions on which I am seeking information are the following: Where are these larvae found? How large are they when they become harmful to the host? How many can a sheep carry without showing inconvenience? Do sheep ordinarily carry these larvae in small numbers without visible affection? Are the very small larvae harmful?

In the heads examined I found only one or two in each case that measured as much as one-half inch in length, but I found many that were about one-eighth inch long.

The symptoms observed were discharge from the nostrils, sneezing, coughing, eyes inflamed and blindness, dullness, unsteady gait, violent elevation of the head, falling over backwards, decubitus and death. The duration of the ailment from the time of the staggering gait until death was from one to three days.—J. B. B.

Reply by Dr. E. T. Baker: Much has been written from a theoretical standpoint on the subject of gad-fly infestation in sheep, but from a practical phase, our knowledge is almost nil. Whether the larvae of the Oestrus ovis produces a sapremia or whether the constant irritation and lack of rest brings on weakness and later death has never yet been worked out.

There is certainly something predisposing, for in a band of a hundred head, all will be infested more or less, and sometimes the one showing the least number of larvae will be the leading subject in a barnyard autopsy.

The adult fly, as is well known, attacks the sheep in the heat of the day during the latter parts of June, July and August. The living larva is deposited in the nostrils, and the parasite is provided with two hooks, and using a caterpillar motion, gradually works up into the frontal sinuses where it remains for nearly ten months, then drops out, burrowing into the ground and passing six weeks in the pupal stage. From the middle of January to April will be found the most trouble, and just exactly what happens is beyond the writer.

Just why experiment stations and colleges have avoided any work on this most important subject but persist in spending the tax-payers' money on projects such as "The Causative Factor of Blue Eyes in Potato Bugs" is a conundrum to the writer.

As indicated in the query, there are a lot of things that a practitioner would like to know about gad flies, but if there is any late information on the subject the writer is unaware of it.

The treatment consists in telling the client to keep the sheep in good condition: plenty of oats and water, and when one animal gets weak segregate it. Medicinal treatment will only cause the client to avoid the practitioner in the future and say: "Doc is an optimistic cuss, but he doesn't know beans about sheep." The writer has tried everything in Merck's index, almost, and only lacked one hundred per cent of getting perfect results.

STRONGYLUS CONTORTUS INFECTION IN LAMBS

This investigation was conducted at Simcoe, Ontario. The owner reported that his spring lambs, the offspring of purebred Southdown ewes, had done well until about the middle of August, 1922, when several became sick and died. From that time until the beginning of 1923, there were increasing fatalities and the remainder of the flock were unthrifty.

At the time of visit to the premises on January 3, 1923, the following symptoms were presented by the flock. General dullness, poor appetite, increased thirst, fetid diarrhea, paleness and blanching of the mucous membrane. In many the temperature was increased and they showed marked lassitude, unthriftiness and poor condition; the fleece appeared hard and matted.

A hemoglobin test of the blood showed that the unthrifty animals were anemic. Examination of the feces revealed the presence of para-

site eggs. One of the sick lambs was killed and a postmortem examination made. The carcass was very cachectic and the cause of the trouble was discovered in the abomasum or true stomach in a very heavy infestation by parasitic worms, the Strongylus contortus.

The owner was advised to keep the lambs in future on high dry pasture, to avoid low damp ground which facilitates infection and to give bi-monthly treatments of copper sulphate solution. As a result no further losses occurred in the flock, their general condition improved and the owner was gratified to have the cause of the trouble discovered and remedied.—Report of Ontario Veterinary College, 1923.

FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease has been known in Europe since the seventeenth century and in England since 1839. Its prevalence is world-wide, and the fight against it has occupied the time and energy of many of the best brains of various countries, yet its spread and ravages still cause huge losses, and there is much about it of an elementary nature that does not seem to be known. Can the spread of the disease be limited by strict sanitary measures and disinfection? There is some evidence that this is impossible.

In Switzerland sanitary measures are carried out which would hardly be tolerated in this country, and yet infection spreads. When the disease is declared on a farm it is fenced or wired in. The milk must not leave the place, the children must not attend school, and workers lodging on the holding must not go to work. Urgent field work is carried out by neighbors, and these neighbors also revictual the farm. The whole place is held up in a state of siege. Nobody who has attended the sick cattle is allowed to leave the place on any pretext whatever; feathered stock, cats and rabbits are killed; disinfection of the sheds and cattle is carried out by trained men under the supervision and direction of veterinary surgeons. If it was possible to prevent the spread of aphthous fever by sanitary measures, it can hardly be doubted that the Swiss would have succeeded in the struggle.

Yet in spite of all this energy, and although Swiss conditions are favorable for sanitation, the state of the country as regards foot-and-mouth disease is no better than that of the countries which surround it. Is not the reason for this that certain animals act as carriers? Subjects that have had the disease once, contain the virus in a latent form in their internal organs for a long time, and in this condition pass out infection on their surroundings or neighbors. At the time when cattle are brought in and richly fed, getting insufficient exercise and in many cases breathing bad air, the disease seems to awaken to a new lease of life. Through these three factors, digestive disturbances arise and toxins form which may materially help the action of the virus.

One little matter that needs clearing up more plainly is whether the disease is purely one of domestication. About half a dozen textbooks I have referred to state that the malady may be contracted by all cloven-footed animals. One French book qualifies this by stating that "wild herboivora are apt to infection." Curiously enough the general statements about all cloven-footed animals being liable to infection are not supported in any instance by an account or description, either authentic or otherwise, of a case of the disease in any wild animal. A reliable observer, H. Lenthold, Gams (St. Gallen), says that in the carrying out of many years' duties in connection with aphthous fever he has never seen a case of the disease in deer or chamois that have been in intimate contact with cattle suffering from foot-and-mouth disease. Is there any record of a guinea-pig being naturally infected with foot-and-mouth disease? If the disease is limited to domestic cloven-footed animals, one point in its investigation may have been gained.—G. Mayall, M. R. C. V. S. in The Veterinary Journal.

TREATMENT FOR WARTS IN DOGS

I have quite a number of cases of papillomata in the mouths of dogs and should like some information as to treatment.—J. T. B.

Reply by Editor: A common treatment for warts in and about the mouths of dogs is to rub them once daily with a swab saturated with Fowler's solution. To my mind, equally good results are obtained by simply giving the Fowler's solution internally in full therapeutic doses.

If any of the warts are pedunculated or if they can be picked up with forceps, it pays to clip them off before treatment is commenced, but for small warts and flat ones, excision is unnecessary. Recovery from this condition is usually very prompt where the treatment outlined above is followed.

The Army Veterinary Service in Connection with Animals

By Capt. Geo. H. Koon

(Continued from April issue)

The Sanitary Report

Veterinary officers are expected to be familiar with all approved measures for preventing the spread of communicable animal diseases and are held responsible for their proper application at all times. A constant lookout is maintained for the appearance of such diseases or of conditions which may tend to encourage their spread among animals wherever they may be stationed. Unremitting watchfulness is necessary with reference to animals issued, shipped, or transferred from one command to another, and under the special conditions incident to field service in the tropics or otherwise where hardships and exhaustion, restricted or improper food and water supply, and defective management have lowered the resisting powers. Such animals are also liable to exposure to the diseases common among civilian animals and peculiar to the country. Under these circumstances communicable diseases readily gain a foothold among army animals, spread with great rapidity, and may produce severe losses in a short time. Green animals newly purchased are notoriously liable to communicable diseases, due to their lowered vitality from shipment and to the probability of exposure to infection; hence the requirement for their segregation for 21 days after receipt and other precautions necessary to limit disease among them.

Upon learning of the existence or suspected existence of a communicable disease or the prevalence of conditions tending to produce such disease among the animals of a command or station, or among civilian animals adjacent to the station, the veterinarian thereof at once makes a thorough investigation of all conditions and recommends such action as he deems proper to prevent or control the disease and limit its extension. Should he deem advisable the quarantine or other restriction of movement of the animals of a unit or station he so recommends, including in his recommendation the nature and extent of the quarantine. He advises when a quarantine should be modified or removed. He supervises its operation and ascertains whether its requirements are fully and conscientiously met by all concerned.

An animal infected or suspected of infection should be segregated from other animals without delay and individual isolation maintained so far as practicable and warranted by the importance of the disease. An animal infected with glanders, anthrax, or surra, is destroyed as soon as the diagnosis is established, and the carcass disposed of in an approved sanitary manner. One infected with other communicable disease is continued in isolation until considered no longer a menace to other animals. Animals suspected of infection are handled with as much precaution as if they were actually infected until such time as a definite decision has been made by the responsible veterinary officer. All other animals in the lot, shipment, organization, corral, stable, or other place in which a case or suspected case of communicable disease is found, are regarded as contact animals. Prompt steps should be taken to prevent their further contact with sound animals anywhere, through the adoption of segregation and quarantine measures.

As a general rule, animals known to be or suspected of being infected with a given communicable disease or to have been in contact with known or suspected cases should all be subjected to the same quarantine procedures. In addition to the individual isolation required for known or suspected cases of the most serious of these diseases, all infected, suspected, and contact animals should be segregated in a clean stable or corral, and the stable or corral in which the original case was discovered thoroughly cleaned and disinfected under veterinary supervision in accordance with approved methods. Forage and bedding suspected of infection will be promptly destroyed. They should be fed and watered at their stable. Should occasion arise to water elsewhere, buckets will be carried and used exclusively for this purpose and access to watering troughs elsewhere prohibited. Badly infected corrals should be excluded from use temporarily or, in more serious cases, plowed and seeded. Attempts at surface disinfection of soil by the application of ordinary disinfectants are useless. Upon being released from quarantine, the animals should be turned into clean quarters and the

corral or stable in which they have been kept will again be cleaned and disinfected as already described, irrespective of whether any cases of communicable diseases have developed during the quarantine period.

The duration of quarantine measures must depend on the various factors to be considered as peculiar to each disease. Release from quarantine is not permissible until the usual period of incubation has elapsed since the last exposure in the case of contact animals, and should be further dependent on all such animals in a given group reacting negatively to the laboratory and other tests which may be prescribed from time to time for the detection of disease. The development of a suspected case in a group of contact animals should be regarded as a further exposure, at least until the suspected case is proven to be negative.

The foregoing measures stringently executed are particularly applicable to serious conditions, such as glanders, anthrax, mange, etc. In handling animals which have been in contact with other less serious communicable diseases, such as the common respiratory affections, skin diseases (except mange), tetanus, etc., conditions which, although less striking in their immediate effect, are nevertheless the cause of much disability, the application of the approved quarantine measures in a modified degree will ordinarily prove sufficient. Therefore, the segregation and quarantine of animals which have been in contact with cases of the less important communicable diseases above named is not always necessary or practicable, unless specifically recommended by a veterinary officer. It is, however, most essential that the patient itself be removed promptly and its surroundings and equipment subjected to painstaking cleaning and disinfection before sound animals are permitted to come in contact therewith.

Upon the discovery of the first case of anthrax, forage poisoning, glanders, glanders suspect, epizootic lymphangitis, mange, mange suspect, or surra among the animals at or near a station or separate command or in a shipment of animals, the veterinarian thereof notifies the commanding officer, and if the case originated at another station, the veterinarian of such station. The station veterinarian or other veterinary officer discovering the case also notifies immediately by special-delivery letter or telegraph the surgeon of the department or corps area, and in case of commands within the continental limits of the United States, the Surgeon General, stating that the veterinarian of the station at which the case originated has been notified. If any shipment which has previously left the station contains animals which may reasonably be assumed to be contacts to the disease in question, the veterinarian of the receiving station is likewise notified by the most expeditious method practicable.

In reporting cases under the provision of this paragraph, an initial case is interpreted as meaning any case occurring at a station where no case of the same disease has developed within a period of time equal to the average incubation period of that disease plus the period during which the primary case remained infective after it was reported plus such time as might be required where an intermediate host is concerned.

Routine reports of communicable diseases are rendered on Form 86bV, M. D., by all veterinarians of stations or separate commands in conformity with Army Regulations and the instructions on the back of the form. From the discovery of the first case of communicable disease to the time when negative tests and complete recovery have demonstrated its eradication and the sick and contact animals have been released from quarantine, the station veterinarian notes on the monthly veterinary sanitary report the number of cases and their disposal by recovery, death, or destruction, the number treated, kind and results of tests, the origin and progress of the disease, the results of special treatment, the nature and efficiency of the quarantine, and other measures adopted to suppress the disease, reasons for failure in any respect, and any other information necessary to acquaint superior authority with all facts concerning the epizootic. This report is not to be rendered perfunctorily but in reality will be a brief report of the movement of communicable animal diseases in the command for the period covered. If no communicable diseases occur in the command, definite statement to that effect is made. Special professional reports of epizootics are forwarded to the Surgeon General promptly, through medical channels, and only abstracts or brief summaries of such reports incorporated in the monthly veterinary sanitary report.

The veterinarian of every station or separate command promptly notifies the state veterinarian, or like official in charge of live stock sanitary matters, of all cases of glanders or other communicable disease occurring at or near the command of which such authority would take cognizance were the same to occur in the community subject to its supervision. This report

is made in such form as may be desired by civil authorities. This requirement applies to animals offered for sale to the government and rejected by a purchase board. Station veterinarians are required to fully inform themselves regarding the live-stock sanitary requirements of the state or territory in which they are located.

Veterinary sanitary measures are initiated in the army for the purpose of controlling and preventing communicable diseases and improving the physical state of its animals. The immediate practical importance and value of the measures initiated for these purposes are reflected in the vital statistics of animals, and it is therefore of the highest importance that information of this nature be constantly available at military stations, in the offices of surgeons of departments and corps areas, and the War Department, respectively. During period of mobilization and in war the constant availability of information of this nature is of primary importance, not only in the zone of the interior but also in the theater of operations. The data required in the preparation of the necessary tables and charts will be abstracted from the statistical report (Forms 86aV and 86bV, M. D.) submitted at regular intervals from all military commands. The following information relating to current vital statistics of animals based on data secured from the statistical report is kept constantly available in the office of the senior veterinary officer of all military stations with an average animal strength of 400 or above, in the office of the surgeons of department and corps areas, in the office of the Surgeon General of the Army, under such instructions as to secrecy in time of actual or threatened hostilities as may be directed.

(1) Tables showing current strength; annual ratios per 1,000 of admissions from all causes and admissions for disease only; noneffective rate per 1,000 on day of report; number of cases and annual ratio per 1,000 of such communicable diseases as may be designated by the Surgeon General from time to time, and such additional ones as may be designated by the chief surgeon of an expeditionary or other force.

(2) Charts ruled in such manner as to cover a period of at least one year and showing continuous annual ratios per 1,000 of the data referred to in the preceding subparagraph. The time intervals to be used in posting charts will be not less than one month. These charts will be available for examination by inspectors, commanding officers of stations, and others concerned.

General instructions for use as a basis in the preparation of tables and charts of vital statistics of animals are issued by the Surgeon General of the Army from time to time.

The foregoing will serve to show the army ideas as to quarantines, the prevention of the spread of communicable diseases and reports and records required of the incidence of such diseases. This is not the place to go into a text book description of those diseases met with in the army or how handled, but it is believed essential to discuss briefly some of the phases in connection with glanders, and especially with reference to mallein testing. The extensive losses which glanders has occasioned in the past whenever animals in considerable numbers have been brought into close contact with each other, demand the adoption of extreme measures in the army to keep the disease under control.

Prevention of Glanders

The important measures to prevent the appearance and propagation of glanders in a command comprise early diagnosis, prompt isolation and destruction of the infected animal and the sanitary disposal of the carcass, the application of thorough disinfection, and the quarantine, close observation, repeated examination and testing of suspects and contacts. There is no treatment for the infected animal other than prompt destruction. Hence the essential measure of control in all cases is a prompt and accurate diagnosis. The diagnosis is based on the clinical signs and the results of mallein or serological tests. Veterinary officers should at all times be on the alert to detect the clinical signs of the disease, which are many and varied, necessitating frequent and careful physical examinations. The existence of an open lesion means a vast increase in the possibility of dissemination; therefore it is the constant aim to detect the infection prior to this event, for which purpose frequent mallein tests are utilized.

Two kinds of mallein tests are authorized, the ophthalmic and the intradermic. In cases of doubt, following an intradermic test, laboratory serological tests consisting of the complement fixation and the agglutination tests are prescribed.

The ophthalmic test is authorized only at the time of purchase because of the rapidity with which a definite decision may be reached. Every newly purchased animal will receive this test in case a veterinary officer be available.

Animals are generally purchased contingent upon passing a negative test unless it is practicable to first apply and read the test. When purchased under this contingency, any reaction other than negative is cause for rejecting the animal, which should at once revert to the owner for disposal under local sanitary livestock regulations. Consequently, re-testing and serological tests following its use are unnecessary.

The intradermic mallein test consists of the injection of mallein into the skin of the lower eyelid and the interpretation of the resulting reaction. It is the standard mallein test prescribed for general use in the army at all times excepting at purchase.

A mallein test is mandatory—

(1) At time of purchase, if a veterinary officer is present or available.

(2) In case of newly purchased animals, immediately after arrival at any station or depot.

(3) In case of newly purchased animals, before release from the 21-day quarantine which all such are required to undergo on arrival at any station or depot and irrespective of the result of the first test at the station.

(4) In case of animals not newly purchased, just prior to release from the 21-day quarantine which all such are required to undergo on arrival at any station.

(5) Before issue, shipment, turn in, or transfer from any station or hospital thereat to another station or hospital thereat unless tested within the preceding 21 days.

(6) Before sale to civilians, unless tested within the preceding 21 days.

(7) Before turning in to a depot by an organization, unless tested within the preceding 21 days.

(8) Before embarking on an animal transport, unless tested within the preceding 21 days.

(9) In case of all captured animals. Such animals will be treated as newly purchased animals under subparagraphs (2) and (3).

(10) In the case of privately owned animals, including officers' mounts, allowed to enter a command, unless accompanied by evidence satisfactory to the station veterinarian of a negative test within the preceding 21 days.

(11) On all contacts with clinical cases or with animals reacting positively or with animals reacting suspiciously to a mallein test.

(12) On receipt at a veterinary hospital from another station, unless tested within the preceding 21 days, in which case they will be tested at the end of the 21-day period.

(13) In case of any animal suspected from clinical signs, but not definitely determined to be glandered, irrespective of the date of last test.

(14) At least once every six months in the case of every animal not tested under any of the foregoing subparagraphs.

So far as practicable, semiannual tests will be made during April and October of each year.

The veterinarian of a station or command is responsible for advising when a mallein test shall be undertaken and for the supervision of all its details. He will use any veterinary personnel available for this purpose, assigning the work of applying the test and interpreting it to officers selected for their suitability. He will so arrange the work that the officer who applies the test to one or more animals will, in so far as practicable, make all the readings for the same animals. It is not contemplated that mallein tests will be made or interpreted except by veterinary officers, or when veterinary officers are not available by properly qualified civilian veterinarians.

Animals should not be allowed to remain untested for long periods. While the veterinary officer should always be on the lookout for suspicious cases and should test such individuals whenever in doubt, yet it is no excuse for not testing to state that there was no reason for suspecting the presence of glanders. The only real evidence for regarding the station as free from glanders is embodied in records of routine tests of all animals at the prescribed intervals.

The authority and cooperation of commanding officers is always necessary when wholesale tests are undertaken, since some interference with military duties is inevitable. The veterinary officer should make suitable recommendations to the commanding officer, advising the selection of such times for testing as are most convenient to all concerned, and station commanders will afford such assistance as may be necessary.

All animals destroyed pursuant to a positive clinical diagnosis or as a result of a mallein or serological test will receive a careful autopsy. A thorough search should be made for characteristic lesions; if none are found, this fact should be frankly reported. It may be difficult or impossible to demonstrate the presence of glanders by autopsy. Where animals are frequently tested, as is the case in the army, the mallein or serological test often reveals the presence of the disease in its incipient stage

and before glanders lesions are perceptible to the naked eye. Consequently such autopsies are frequently negative.

Specimens showing any pathological changes found at a glanders autopsy, irrespective of whether such lesions are considered positive, suspicious, or negative, will be sent to the designated laboratory for examination. The specimens will be accompanied by a report on the prescribed Medical Department blank forms containing the data required.

Other Diseases

Dermatitis gangrenosa, with its resulting complications, has been one of the chief causes of animal disability and loss in the army where large numbers of animals are gathered in certain localities, and its control demands incessant watchfulness.

Of all the causes of wastage of animals in the war by the element of communicable disease, mange is by far the most serious and important. Its incidence in some of the American divisions in the World War reached 100 per cent.

The dipping method of treatment is considered the best where large numbers of animals must be treated. The lime and sulphur dip is a valuable parasiticide and when used will be prepared and applied strictly in compliance with these instructions: The ingredients and the proportions in which they are to be used are as follows:

Sulphur, sublimed, 24 pounds; lime (unslaked), 10 pounds; water, 100 gallons.

The mixture is prepared as follows: The lime is slaked so as to form a rather thick paste; the sulphur is then added, and the whole well mixed. In a kettle containing 25 gallons of boiling water, the lime and sulphur mixture is placed, a small amount at a time; with constant stirring, and the contents are then boiled for about two hours (three or four hours boiling concentrates the mixture), being stirred at intervals. After the sulphur disappears from the surface, the mixture, including the sediment, is poured into a barrel provided with a spigot 6-8 inches from the bottom. When settling has taken place the liquid is drained off through the spigot into a suitable container and enough warm water added to make 100 gallons. The sediment remaining in the barrel must not be used for dipping purposes but can be utilized to advantage in the disinfection of fences and buildings.

The specific gravity of an effective lime and sulphur mixture is 1023, taken by an ordinary urinometer with the mixture at a temperature of from 105° to 110° F. Should the specific gravity sink below 1023, more of the stock solution should be added until the correct reading is obtained. When the mixture is too concentrated as indicated by a specific gravity higher than 1023, it will require dilution with water.

It may be found occasionally at first trial that the formula does not produce the result described, but examination will reveal that there is still free sulphur in suspension indicating insufficient boiling. Further boiling of the stock solution will yield a product which on proper dilution will give the correct urinometer reading.

It is most important the lime and sulphur mixture be applied at a temperature between 105° and 110° F. to secure the best results.

The number of applications necessary is governed by the extent of the infection. A single dipping will usually destroy the parasites on a contact animal. In the treatment of infected animals repeated applications are usually required to secure the penetrating effect of the parasiticide and the only rule to be followed is to continue applications until all evidence tending to show the presence of parasites has disappeared. The usual interval between applications is seven days. The possibility of recurrence from deep seated lesions not affected by the treatment and of reinfection must be constantly borne in mind.

Under the designation of "shipping fever" is included a group of true infectious diseases, such as influenza (pink eye), strangles (distemper), pneumonia, and the complications which accompany them. These conditions are responsible for high mortality and inefficiency rates, particularly among newly purchased animals, which are peculiarly susceptible.

The treatment of these diseases under army conditions, when large numbers of animals may be affected at one time, differs materially from what can be done in civil life or in handling smaller groups of sick animals. Under army conditions it is not possible to rely so much upon medical treatment. For this reason a maximum amount of attention must be given to prophylactic measures and to nursing. There is no recognized specific for the prevention of "shipping fever" other than the avoidance of exposure. All efforts should therefore be primarily directed toward preventing infection. The careful examination prescribed for green animals on arrival at a station and the 21-day quarantine period which each lot should undergo are measures of extreme value in weeding out the sick and insuring their prompt treatment and in protecting the health of other animals.